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THE CANADIAN FOOD MANUFACTURING INDUSTRIES - RELATIONSHIPS WITH THE LEVELS OF CONCENTRATION

by

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A THESIS

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled THE CANADIAN FOOD MANUFACTURING INDUSTRIES - RELATIONSHIPS WITH THE LEVELS OF CONCENTRATION submitted by ROBERT A. FUNNELL in partial fulfillment of the requirements for the degree of MASTER OF SCIENCE in AGRICULTURE.

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ABSTRACT

The purpose of this study is to examine the nature of the relationships which may exist between concentration, price stability, price-cost margins (as a proxy for profits) and nominal and effective tariff rates for the Canadian food manufacturing industries. The information gained from this study and other studies may be of use in developing performance criteria and in formulating a concept of "workable competition." It is hoped that these criteria might be used in developing future combines legislation.

The study examines four main hypotheses. The first is that the relationship between concentration and the level of price stability is greatest within the "medium" range of concentration. "Medium" concentration is defined as a 4-firm concentration ratio between 30 percent and 65 percent. The second hypothesis is that the level of profits is a function of the level of concentration. The third hypothesis examined tests the relationship between concentration, the degree of price stability and profit levels. These hypotheses imply that in industries of "medium" concentration prices will tend to be stable relative to conditions of "low" or "high" concentration, and profits will be moderate relative to conditions of "high" concentration.

The fourth hypothesis examined is that the degree of tariff protection afforded food manufacturing industries has promoted concentration by restricting the impact of imports on domestic production.

Examination of the relationship between industry price stability indices and industry concentration ratios over all industries gave results which were statistically non-significant at the 90 percent confidence level. However, when the industries were segregated into "high" , "medium" and "low" ranges of con-

centration, evidence was found of a statistically significant relationship between the price stability variable and the 1965 concentration ratio variable within the "medium" range of concentration. This relationship did not prove to be statistically significant for the inflationary period of 1972.

When the relationship between the concentration ratio data and the average price-cost margin measures was examined, the estimated coefficients on the price-cost margin variables were found to be statistically significant. The price-cost margin variable explained 30 to 34 percent of the variation in the concentration ratio variable.

The relationship between the 1965 industry concentration ratio data and the 1972 industry price-cost margin measurers also proved to be statistically significant.

Examination of the relationship between concentration, price stability and profit level variables yielded results which tended to confirm the existence of a relationship, but suggested price stability to be the main explanatory variable in explaining variability in concentration ratios.

In examining a simple linear relationship between 1965 concentration ratios for the Canadian food manufacturing industries and the nominal and effective tariff rates for the years 1961, 1966, and 1970, a statistically significant negative relation was apparent for the years 1966 and 1970. These results are not consistent with the fourth hypothesis that the degree of tariff protection afforded food manufacturing

industries has promoted increased concentration levels.

The relationship between tariff levels and price-cost margins was also examined. The results were generally nonsignificant. No definite conclusion could be drawn from this section of the study.

The final relationship tested was that between concentration levels, price-stability, tariff levels and the level of profits. The effective tariff rate variables and the price stability indices proved to be the most significant in explaining variation in price-cost margins.

The results of this study indicate that a positive relationship exists between the degree of price stability, the level of profits and the level of concentration. If we define the norms of workable competition so as to include stable prices and moderate profit rates, the results of the study imply that industries of "medium" concentration are the most workably competitive. On this basis, future Canadian combines legislation should be designed so as to encourage industries of "medium" concentration and therefore promote stable prices and moderate profit rates.

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Chapter 1

INTRODUCTION

The Canadian economy is characterized by a wide variation in the sizes of its industries as well as a wide variation in the concentration ratios associated with these industries. This study will examine the hypothesis that under conditions of "medium" concentration an industry will tend to exhibit relatively stable prices and moderate profit rates. The study focuses upon the food manufacturing industries in Canada. These are characterized by a wide variation in concentration ratios. This feature will allow examination of the results arising from different concentration ratios in industries having relatively similar consumer markets, marketing channels and product characteristics.

A second feature tested in the study will be the degree to which the level of tariffs and the level of concentration in food manufacturing industries appear to be related. If high tariff levels tend to promote higher concentration levels, then any policy directed at maintaining a certain range of concentration must consider the impact of existing and proposed tariffs.

The relationship between tariff rates and profit rates is also examined. If an ultimate policy objective is to encourage moderate industry profit rates, we will want to know whether tariff rate adjustments appear to have any effect

in trying to achieve this objective.

In Chapter 2 a summary of literature which has dealt with some of the aspects of the above relationships is presented.

A further policy consideration is the effectiveness of anti-combines legislation in hindering or promoting the degree of concentration deemed desirable. If the hypothesis that industries of "medium" concentration tend to exhibit relatively stable prices and moderate profit rates, appears true, it becomes desirable to direct the structure of Canadian industry towards that of "medium" concentration. Chapter 3 of the study reviews two merger cases which have come under existing anti-trust laws and analyzes the effectiveness of the outcomes.

The data and the models tested, as well as the results from examination of these models are presented in Chapter 4. There is a lack of information with respect to concentration ratios of Canadian industries. It was necessary to use the concentration data for 1965 from a Department of Consumer and Corporate Affairs study.[1] The concentration data were assumed to be representative of the fourteen year span covered by the study. The approach taken was to use the 1965 concentration ratios and relate these to changes in the selling price indices for the industries studied. The study

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[1] Department of Consumer and Corporate Affairs, Concentration in the Manufacturing Industries of Canada (Ottawa; 1971).

then focused on industry profit rates in relation to the level of concentration. Use was made of Collins and Preston's[1] price-cost margin as a proxy for profit rates. The final step in the analysis was to examine the impact of nominal and effective tariff levels upon the level of industry concentration ratios and the level of profits.

The remainder of this chapter examines the rationale for the study.

The Nature of Workable Competition

Pure competition has for a long time been cited as the perhaps unattainable ideal toward which a healthy free enterprise economy should direct itself. But the pattern of development of the Canadian economy has not tended to reflect this norm of pure competition. This feature appears, at least in part, to have been due to technological developments through which economies of scale and the need for relatively large accumulations of capital have arisen. The result has been the formation of numbers of relatively large conglomerate firms. These often control large shares of the market. In addition, the pure competition assumption of perfect information does not normally apply in practice. Nor do the features of homogeneous products, free mobility of resources and independence of buyers and sellers—all of which are require-

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[1] Norman R. Collins and Lee E. Preston, Concentration and Price-Cost Margins in Manufacturing Industries (Berkeley: University of California Press, 1968).

ments of the pure competition model.

Oligopoly, as contrasted to pure competition, is characterized by a situation in which we have more than one seller, the activities of whom affect the decisions of other sellers in the market. Products may or may not be homogeneous and the availability and mobility of resources may have great impact upon the competitive nature of the market.

An important question which arises from the above features is that of deciding to what extent an industry can deviate from the assumptions and conditions of pure competition without becoming excessively inefficient in terms of eliminating the benefits to be gained from competition.

No modern economist can realistically believe that the actions of one industrial seller will not in some way affect the response of his competitors. This factor has tended to refute the existence of pure competition and has led to various formulations of 'workable competition'. The term 'workable competition' is a term developed by Clark in the 1940's to provide a more realistic norm or benchmark to gauge the practical requirements to attain a degree of 'desirable' competition in real life situations. Clark believed that "...the most effective forms of competition we have, or can have, are imperfect forms, since there are no others."[1] He therefore felt the need to define a concept of workable competition which would allow for an evaluation of the degree of

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1. J. M. Clark, "Toward a Concept of Workable Competition," American Economic Review 30 (June 1974):242.

competitive efficiency within an industry relative to this defined norm. He argued that it was necessary to allow for discrimination with respect to price and also allow for a degree of excess capacity in order to accomodate short run fluctuations in demand. Therefore, a firm might be said to be efficient although its production might not always be at a point of minimum cost. This feature also allows for enough price flexibility to stimulate demand in depressed conditions or the reverse in expansionary periods, as well as permitting active price competition.

Markham proposed what he considered to be a less rigid definition of workable competition. "Since the concept owes its creation to a public policy need and not to the logic of abstract theory, it can, at best, be divorced only in part from value judgments."[1] This view implies that there is no universally applicable set of market conditions to define workable competition. Acceptance of this viewpoint is also implied in the extensive literature discussing the interrelationships of market structure, conduct and performance. Market performance cannot be definitely predicted from a given type of structure. Given the real world economy, the multiplicity of structural and conduct variables and their interactions make it difficult to make any absolute statements concerning the efficiency outcome of a given market structure.

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1. J. W. Markham, "An Alternative Approach to the Concept of Workable Competition," American Economic Review 40 (June 1950):349.

It is therefore necessary to generalize about the nature of these inter-actions. One generalizes in order to give some criterion by which to judge the degree to which an industry is workably competitive. After testing to find valid generalizations an attempt can be made to predict likely performance characteristics. Through these generalizations, it might be possible to develop criteria for industry structure and performance which are based on economic and social principles and applicable to the real world economy.

The Problem and Assumptions

This study attempts to examine the relationships between industry price stability, tariff rates, profit rates and concentration levels in the Canadian food manufacturing industries. It is implicitly assumed that relatively stable prices and "moderate" profit rates are desirable performance attributes. Whether or not price stability is an entirely desirable performance characteristic has been debated by a number of authors.[1] Nonetheless, a 'reasonable' level of price stability has been one objective of Canadian public policy--

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[1] For example see: F. V. Waugh, "Consumer Aspect of Price Instability," Econometrica 34 (April 1966):504; Paul A. Samuelson, "The Consumer Does Benefit from Feasible Price Stability," Quarterly Journal of Economics 86 (August 1972):476; Berton F. Massel, "Price Stabilization and Welfare," Quarterly Journal of Economics 83 (May 1969): 284; Walter Y. Oi, "The Desirability of Price Instability Under Perfect Competition," Econometrica 29 (Jan. 1961):58.

though success in achieving this objective in recent years has been limited. Prices should respond to supply and demand conditions and thus perform their allocative function. Rigidly fixed or markedly unstable prices do not provide adequate guidance for allocation decisions and thus are assumed implicitly undesirable by this study, as are those market imperfections or factors which lead to rigidly fixed or markedly unstable prices.

The performance criteria of "moderate" profit rates can be thought of as a return on investment sufficiently high to cover any opportunity costs associated with the investment. At the same time the return should be sufficiently high to promote stability in an industry. However, this stability should not be the result of high barriers to entry in an industry as these high barriers to entry might allow firms in the industry to maintain excess profits in the long run. It is probable that pricing which is stable and generated by the forces of supply and demand will give rise to moderate profit rates.

The problem, therefore, is to examine the relationship of concentration to price stability and to determine the profit rates generated by different levels of concentration. Since it is impossible to define absolute levels of concentration which will generate a given outcome, one must set arbitrary boundaries delimiting areas of "low", "medium", and "high" concentration (these terms are defined in later chapters).

The hypothesis underlying this study is that, in general, under conditions of "medium" concentration, prices will tend to be relatively stable and profit rates will tend to be moderate relative to conditions of "low" or "high" concentration. Therefore, firms in industries which exhibit "medium" concentration are most likely to approach a concept of workable competition which assumes price stability and moderate profit rates as its norms. Under conditions of "low" concentration where the industry tends toward perfect competition we would expect to find that there is greater price instability. This is expected as a result of low barriers to entry allowing for the emergence of numerous small firms during times of prosperity and their disappearance during recession. This in turn tends to give rise to a dynamically unstable market structure.

Under conditions of "high" concentration the industry tends toward monopoly and market power rests in the hands of a small number of firms. Here, stable prices may be associated with excess profits which are in turn due to relatively high barriers to entry. These high barriers to entry might allow the firms already in the industry to restrict supply so as to maintain profits. This situation may also result in conditions of excess capacity.

Under conditions of "medium" concentration one may expect that barriers to entry are likely to be sufficiently high to allow long run efficiency in scale and capacity to develop. However, entry barriers are not likely to be so high

as to eliminate threat of competition. Bain states that in industries of moderate concentration "...established sellers will set prices low enough to forestall entry and will establish and maintain reasonable efficiency in scale and capacity, since in such cases the discounted long run profit offered by this course is likely to be the greatest attainable."[1] As the barriers to entry become lower, there is less liklihood of firms in an industry colluding with respect to price. The general tendency is for "...industries of moderate concentration to have relatively lower average prices and profits and less output restrictions than those of high concentration."[2] The most workably competitive industry therefore seems to be one in which concentration is moderate as are the barriers to entry.

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1. Joe S. Bain, "Workable Competition in Oligopoly: Theoretical Considerations and Some Empirical Evidence," American Economic Review 40 (May 1950):42.

2. Ibid., p.44.

Chapter 2

REVIEW OF SELECTED LITERATURE

In this chapter a summary of literature dealing with the relationships between concentration ratio, price stability and profit level variables is presented. These studies were useful in formulating the hypotheses and models of this study.

Two Studies by Bain

A study which has often served as a focal point for discussions about the relationship between concentration and profit levels was done by Bain[1] in 1951. In this study, Bain analyzed the relationship between the degree of seller concentration and profit rates within American manufacturing industries from 1936 to 1940. His hypothesis was "... that the average profit rates of firms in oligopolistic industries of a high concentration will tend to be significantly larger than that of firms in less concentrated oligopolies or in industries of atomistic structure."[2] He suggests that this would be the case due to the existence of express or tacit collusion in oligopolies of high concentration which would allow for the generation of returns in excess of costs (excess profits).

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1. Joe S. Bain, "Relation of Profit Rate to Industry Concentration: American Manufacturing, 1936-40," _The Quarterly Journal of Economics_ 65 (August 1951): 293-322.

2. _Ibid._, p.294.

Industries of lower concentration would be unable to maintain collusion as effectively.

The profit measures chosen by Bain were profit levels expressed as a percentage return on equity, as he considered this the most convenient form for measuring profits. Experimental calculations had revealed no significant difference between the equity rate, the rate of excess profits on sales, and the rate of earning before interest on total investment, as measures of profitability. Data for profit rates on equity were taken from the Security and Exchange Commission's Survey of American Listed Corporations 1936-40.

For the concentration data, representative industries were selected from the U. S. Census of Manufacturers for 1935. The sample consisted of 42 U. S. manufacturing industries for which Bain considered that adequate profit data and adequate concentration measures were available. Bain justified the use of 1935 concentration data and 1936-40 profit data by arguing that industry concentration ratios had been fairly stable through time.

In testing his model, Bain found no significant difference between the results obtained using four-firm concentration ratios and those obtained using eight-firm concentration ratios. His results showed no conclusive indication of a linear relationship between industry concentration and profits. He did find a tendency for relatively high industry profits above the 70% level of eight-firm concentration. Much lower

industry profits were found to be associated with industries having an eight-firm concentration ratio which was between 30% and 70%. Below the 30% concentration level, the tendency was for higher industry profits. "A tentative conclusion is thus that industries with an eight-firm concentration ratio above 70% tended, in 1936-40 at least, to have significantly higher average profit rates than those with a ratio below 70%."[1]

When the relationships between concentration and other potential determinants such as firm size, ratio of capital to total assets, ratio of overhead to total costs, and ratio of net worth to total sales, were tested, no significant results were obtained. Nor were the relationships between profit rates and these determinants found to be significant.

Another study in this field done by Bain[2] attempted to examine the hypothesis that "...under conditions of very or moderately difficult entry, reasonable long run efficiency in scale and capacity should develop, whereas under easy entry (if this is found in oligopoly) the prospectus is much less certain and substantial inefficiency may result."[3] The reasoning behind this study was that existing oligopolists in industries where entry is moderate to difficult would likely set prices low enough to forestall entry. In attempting to

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[1] Ibid., p.314.

[2] Joe S. Bain, "Workable Competition in Oligopoly: Theoretical Considerations and Some Empirical Evidence," American Economic Review 40 (May 1950): 35-47.

[3] Ibid., p.40.

maximize profits they could therefore be induced to become or remain efficient. As the size of the barriers to entry increased, prices could be raised and still forestall entry. Therefore, the higher were barriers to entry, the higher the level of profits that would be expected.

On the other hand, under conditions of easy entry Bain argued that one might expect inefficiency due to an excessive number of firms and market instability due to firms entering and leaving the industry. Consequently, one could expect profit levels to be lower than for firms in industries with higher barriers to entry. It is, however, considered possible that price rivalry might result in economic efficiency -- the ideal of the pure competition system.

Continuing this line of reasoning, Bain suggested that: "Moderate concentration ... should tend to give rise to quasi-competitive market behavior — imperfect collusion, kinked demand curve conformations and the sporadic appearance of chaotic competition — ...."[1]

There are two implications arising out of Bain's argument. First, the degree of concentration in an industry is likely to affect the competitive behavior of the industry in terms of collusive behavior and high barriers to entry. We might expect this form of behavior to be more prevalent in industries of higher concentration. If this feature does, in fact, exist, it could be expected that there would be a

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[1] Ibid., p.44.

positive association between the level of concentration and the level of profits. Secondly, if "chaotic competition" does exist in industries of moderate concentration, it would be likely that prices would tend to be more unstable than in industries of "high" or "low" concentration. This study will attempt to investigate whether relative price stability applies in an industry of "medium" concentration. If it does apply, then it is possible that the barriers to entry are greater than anticipated. Alternatively, this feature may imply that the competitive forces are more competitive and less sporadic than Bain suggests.

It was also suggested by Bain that selling costs may increase in relation to barriers to entry. If we associate high concentration with high barriers to entry, it is possible that increased selling costs may exert a downward pressure on the high profit levels anticipated for industries of high concentration.

Bain suggested that the conditions of entry to markets serve as one criteria in deciding how workably competitive an industry might be. He considered that it is probable there is an inverse relationship between the level of concentration and the degree of workable competition. In this case, it would be expected that industries of moderate concentration with moderately difficult entry would be the most workably competitive in that: "Efficiency should be reasonably good and prices or profits low or moderate."[1] Bain suggested that

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[1] Ibid., p. 46.

firms in industries of high concentration with high barriers to entry would likely be efficient in terms of production techniques, but as a result of the high barriers to entry, they would be able to practice output restriction so as to raise prices and generate excess profits. They would therefore be less workably competitive.

Firms in industries of low concentration with low barriers to entry might tend to be inefficient with respect to scale of operation and unstable with respect to prices and profit levels. We might therefore expect such industries to be less workably competitive.

A Study by Collins and Preston

A study by Collins and Preston[1], which was published in 1968, sets out to examine the question: "Can differences in the relative importance of large firms among industries, as measured by concentration data, contribute substantially to the explanation of inter-industry differences in price-cost margins and profits?"[2] Collins and Preston selected a sample of ten major industry groups from the U.S. Census of Manufacturers. They then collected four-firm concentration ratios and profit data for 1958 for a cross-section of individual industries within each of the ten major industry groups. Due to the differences among profitability measures for different

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1. Norman R. Collins and Lee E. Preston, Concentration and Price-Cost Margins in Manufacturing Industries (Berkeley and Los Angeles: University of California Press, 1968).

2. Ibid.,pp.2-3.

sizes and types of industries, Collins and Preston developed a price-cost proxy measure for profit. This margin "... is essentially the difference between gross revenues and direct costs, expressed as a percentage of the revenues."[1] A similar measure is developed in this study, the major difference being that only revenues and costs associated with the manufacturing activity are considered.

In their study, Collins and Preston found an apparent relationship between the level of concentration and price-cost margins in six out of the ten major industry groups. Although the relationship was statistically significant, it was not a very strong association. This finding is consistent with Bain's study.

Collins and Preston proceeded to examine the relationship between concentration ratios and price-cost margins for the years 1954, a period of mild recession, and 1947, a period of relative prosperity. The results for 1954 were similar to those results obtained for 1958, which was also a recession year. The correlation between concentration ratios and price-cost margins for 1947 was found to be less significant. Collins and Preston suggested that the greater cyclical variability of smaller and less concentrated industries might eliminate this association during periods of peak prosperity. "It could be, however, that the stronger concentration-profits association found for 1954 and 1958, compared with 1947, is

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[1] _Ibid_., p.54.

a secular phenomenon and will in future be observed at all stages of the business cycle."[1] But, "...if the associations found here for 1958 are also observed for 1963, the next Census year and a year of general prosperity, we shall have reason to believe that the concentration-profits association is not primarily a cyclical phenomenon."[2]

In this study, the relationship between concentration ratios and price-cost margins is examined for two time periods, a twelve year period of relative economic stability and a one year period when there were strong inflationary tendencies.

Another point which Collins and Preston briefly discussed is the deficiency of concentration data in reflecting the impact of foreign trade and competition. They suggested that the lack of consideration of this point is likely to affect the results of any examination of the relationship between concentration and profit rates. The existence of tariffs may also have an impact upon this relationship. It is therefore considered desirable to test whether there appears to be a relationship between tariff levels and the level of profits and between tariff levels and the level of concentration. The results of such tests may aid in assessing the impact which tariffs may have on the concentration-profit relationship.

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[1] *Ibid.*, p.115.

[2] *Ibid.*,

A Study by Schwartzman

Another study which examined the relationship between concentration and profit levels was done by Schwartzman.[1] He tested two hypotheses which were that: "(1) the ratio of price to average variable cost is higher in monopolistic than in competitive industries; (2) among monopolistic industries, the ratio of price to average variable cost declines with the degree of monopoly."[2]

Schwartzman's technique involved comparison of the ratio of gross value product to direct cost for "monopolistic" industries in Canada to the corresponding industries in the U. S. for the year 1954. The ratio calculated by Schwartzman is analogous to the price-cost margin measures which are calculated in this study. Schwartzman chose a four-firm concentration ratio of 50% as the dividing line between "monopolistic" and "competitive" industries.

In discussing concentration in relation to geographic market size, Schwartzman also notes the problem imposed on the measurement of the degree of monopoly by the existence of international markets. For Canadian industries this impact may be of some significance since trade is relatively important. Schwartzman suggested that the existence of a large value of imports might partially be a reflection of "...a combination of high tariffs and high domestic prices."[3] Furthermore, he

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1. David Schwartzman,"The Effect of Monopoly on Price," Journal of Political Economy 67 (August 1959): 352-362.

2. Ibid., p.354.

3. Ibid., p.355.

suggested that it is possible for tariffs to have a significant impact on the direct costs of importing industries and thereby affect the level of profits.

Schwartzman, in his analysis of the price to average variable cost ratios, found these ratios to be higher for monopolistic industries than for competitive industries. "The size of the monopoly effect on price is estimated at 8.3 percent of average variable cost."[1] Using Schwartzman's results, one could suggest that as prices increase due to changing market conditions, these increases in price might be greater in monopolistic industries than in competitive industries. The reason for this might be that monopolistic industries would need to have a greater price change in order to maintain their higher ratio of price to average variable cost.[2] In this study, an attempt is made to examine the relationship between concentration levels and price stability, although no consideration is given to changes in average variable cost.

Although Schwartzman's results did show that higher price to average variable cost ratios applied for monopolistic industries than for competitive industries, his results did

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1. Ibid., p. 359.

2. This would be the case for upward price movements assuming that the relationship of the price to average variable cost ratios of the monopolistic industries relative to the price to average variable cost ratios of competitive industries remained the same.

not explain the variability which existed in the concentration ratios in the highly concentrated group of industries. That is, concentration was not found to be a function of profit rates, even though there was a definite difference in the price to average variable cost ratios between competitive and monopolistic industries.

A Study by Means

Means[1] directed a study in 1939 for the United States National Resources Committee. This study included an analysis of the relationship between economic concentration and price rigidity during depression or during deflationary periods.

Means selected a sample of 37 industries from the Census of Manufactures. As a proxy for price rigidity, he calculated the percentage change in price from 1929 to 1932, for each of the 37 industries. When he ran his regression between concentration and the 'price rigidity' variable, Means found that a statistically significant relationship existed. "When the depression drop of prices in these industries is compared with the proportion of value of product in each which was produced by the four largest enterprises, a rough relation is apparent between concentration and price insensitivity."[2]

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[1] National Resources Committee, The Structure of the American Economy, Part I, 1939 (prepared under the direction of Gardiner C. Means). This discussion is based on a summary article by John M. Blair, "Means, Thorp, and Neal on Price Inflexibility," Review of Economics and Statistics 38 (November 1956): 427-435.

[2] Gardiner C. Means as quoted by John M. Blair, "Means, Thorp, and Neal on Price Inflexibility," Review of Economics and Statistics 38 (November 1956): 428.

One might suspect from examination of Means's study that price rigidity may be less strongly associated with concentration during prosperous periods than during depression periods. Certainly, as noted on page , Collins and Prestons' study showed a less significant relationship of price-cost margins to concentration during prosperous periods than in depressed periods. The impact of expanding demand during prosperous periods could result in price rivalry, especially for firms in industries of low concentration. The resulting price instability would likely have a negative impact on profits, although this feature might be outweighed by the increase in demand. We might expect, therefore, that profit levels may have some relationship with both the level of concentration and the degree of price stability.

A Study by Thorp and Crowder

A study similar to Means's which was undertaken about the same time was presented by Thorp and Crowder.[1] As with the study by Means, the time period covered was characterized by depressed economic conditions.

Testing the relationship between the concentration ratios associated with 407 manufactured products and the

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[1] Willard L. Thorp and Walter F. Crowder, The Structure of Industry (Temporary National Economic Committee, 1941). This discussion is based on a summary article by John M. Blair, "Means, Thorp and Neil on Price Inflexibility," Review of Economics and Statistics 38 (November 1956): 427-435.

percentage change in average realized price from 1929 to 1933, Thorp and Crowder concluded that: "The highness or the lowness of the concentration ratios of products does not appear to have any measurable relation to the decreases in average realized price experienced between 1929 and 1933."[1]

Crowder and Thorp extended their analysis to examine whether a relation existed when only concentration ratios for comparable product groups were compared to the relevant price changes. They found no significant relationships. This led them to the conclusion that price rigidity during depression periods was the result of product characteristics rather than concentration.

Eichner's Theory of Pricing Under Oligopoly

Eichner, in a recent article, suggests the nature of the price setting technique employed by oligopolistic industries. Classical economic theory assumed that in establishing the price for a commodity, firms are price takers rather than price setters. Eichner postulates a thoery to explain why oligopolistic firms may be price setters rather than price takers.

Eichner argues that there is evidence that fluctu-

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1. Willard R. Thorp and Walter F. Crowder as quoted by: John M. Blair, "Means, Thorp and Neal on Price Inflexibility," Review of Economics and Statistics 38 (November 1956):430.

2. Alfred S. Eichner, "A Theory of the Determination of the Mark-Up Under Oligopoly," Economic Journal 73 (December 1973):1184-1199.

ation in the level of aggregate demand has not affected the variation in price levels within oligopolistic industries, whereas in more competitive industries prices have tended to vary with the aggregate growth rate. He suggests that the oligopolistic industries may have served to dampen inflation by the very nature of their price setting techniques. Eichner postulates that this price setting involves a cost-plus formula which bases the price of output on a certain percentage mark-up above costs. Eichner argues that since "cost-plus" pricing by oligopolists functions independently of aggregate demand, oligopolists behavor tends to lead to less fluctuation in prices than does the behavior in more perfectly competitive industries. This study, therefore, suggests that as concentration increases, so will the degree of price stability. This tendency is expected to be particularly pronounced during inflationary periods when firms in industries of low concentration would likely be constantly adjusting prices to chaning demand conditions.

Eichner provides an explanation of how the "plus" factor in the "cost-plus" formula may be determined. He suggests that the "plus" factor depends upon the demand for investment funds by the firms in the oligopolistic industry. The level of demand will depend upon the marginal efficiency of investment funds relative to the supply cost or interest rate associated with those fund, both internally and externally. Eichner argues that his hypothesis is also consistent with the idea that oligopolies seek to maximize their long-run rates of growth rather than short run profits.

One might expect Eichner's "cost-plus" formula to be more applicable to firms in industries of "medium" concentration where these firms are seeking to expand. Firms in industries of high concentration may have reached a maximum desirable size. Therefore their demand for investment funds would likely be relatively small and their goal might be to maximize short run profits. If this was the case, we might expect prices to tend to be relatively less stable in industries of high concentration than in industries of more moderate concentration. Cost-plus pricing in moderately concentrated oligopolies could therefore lead to relatively stable prices and moderate profit rates over time.

Chapter 3

CANADIAN COMBINES POLICY
--A BRIEF LOOK AT TWO CASES

Introduction

The purpose of anti-combines legislation is to prohibit or restrict actions by those industries or firms which fail to meet the criterion set forth by the legislators of a society to ensure a desired degree of competition. The Canadian Combines Investigation Act has centered around several rather generally defined criteria. The Act prohibits agreements to restrain trade. It prohibits mergers or monopolies which act "against the public interest." It prohibits resale price maintenance and bans misleading advertising. The generality of these provisions has left them open to a wide range of judicial interpretation. Consequently, enforcement, particularly with respect to the prohibitions on agreements restraining trade and mergers and monopolies against the 'public interest', has been limited. This is probably at least partly due to the lack of consistent or objective criteria by which the courts might decide what the desired concept of workable competition and industry performance is or should be.

The anti-combines legislation is presently being revised. The first stage of this revision was encompassed

in Bill C-2 which was recently passed by the House of Commons. This amendment became effective on January 1, 1976. The Bill strengthens the Act with respect to the provisions dealing with misleading price advertising and resale price maintenance. The amended legislation prohibits a number of selling practices (pyramid selling, double ticketing and sale above advertised price). Bill C-2 also extends the Combines Act to cover service industries. It also attempts to strengthen the government's ability to deal with collusive agreements in restraint of trade. The second stage of the Bill has not yet been passed. It would provide legislation on which to judge mergers, monopolies, and specialization agreements. As well, the second stage of the Bill would contain provisions which would aim at improving the efficiency of Canadian business and its ability to compete abroad.

In this chapter, two cases in which the Combines Investigation Act was applied to Canadian food manufacturers will be briefly reviewed.[1] The reader should note the problems arising from the lack of precision in wording and thus, the interpretation of the legislation, and the benefits to be gained by having a more specific concept of workable competition.

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1. The discussion in this chapter has drawn extensively on the recorded court cases as presented in Reports of Cases Concerning Combines Held in Various Canadian Courts, Volume 6.

Regina v Canadian Breweries Limited

During the period from March 8, 1930, to January 19, 1959, Canadian Breweries Limited acquired control over thirty-seven other corporations "...which were engaged in the business of manufacturing, producing, transporting, supplying or dealing in beer."[1] Canadian Breweries was charged with the formation of a merger, "...which merger, trust or monopoly has operated or was likely to operate against the interest of the public, whether consumers, producers, or others."[2]

This was the first charge of its kind in Canada and carried with it a maximum penalty of two years imprisonment. To prove the charge, it was not considered necessary by the prosecution to show that the company had acted against the public interest, but only that it had placed itself in a position where it could. "The relevant question thus becomes the extent to which the prevention and limitation of competition are agreed to be carried and not the economic effect of carrying out the agreement." The Crown contended that the merger had changed the market structure of the industry and in doing so had destroyed the competitive process.

Expecting that prohibition was soon to end,

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1. "Regina v Canadian Breweries Limited," Supreme Court of Ontario--Judgment of Chief Justice McRuer at Toronto on February 8, 1960, Reports of Cases Concerning Combines Held in Various Canadian Courts, Volume 6, p.1.

2. Ibid.

3. Ibid., p.4.

Candian Breweries Limited had acquired numercus smaller breweries in an attempt to dominate the market. The founder of the firm was quoted as saying: "I am sure that we now have the power to control prices and sales practices of the industry, and while it may be necessary for us to start local price wars here and there to discipline a small competitor, I am sure the profits will prove most gratifying to the shareholders."[1] Over the period from 1931-58, market share of the accused rose from 11.2% to 60.9%. This placed production and sales in the hands of the "Big Three." The "Big Three" consisted of the accused, Molson's Brewery Limited and John Labatt Limited. Competition among these firms was apparent in all but one area—price competition. However, the provinces had been given the authority to fix the price of beer. These prices were uniform for all brands of beer.

The defense argued that due to the controlled nature of the market, the "Big Three" did not prevent other firms from entering the market either as a result of their economic strength or their adoption of merchandising policies and extensive advertising. "...I do not think it is an offence against the Combines Act for one corporation to acquire the business of another merely because it wishes to extinguish a competitor. It is not the nature of the merger that is important, but what is important is whether it has

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1. Report of the Director of Investigation and Research, Combines Investigation Act, 1956, as quoted in: G. Rosenbluth "Monopolistic Practices and Canadian Combines Law" in John J. Deutsch, Burton S. Keirstead, Kari Levitt, Robert M. Will, The Canadian Economy, Selected Readings (Toronto: The Macmillan Company of Canada Limited, 1965), p.208.

operated to the detriment or against the interest of the public or is likely to do so."[1] The increase in the market share of Canadian Breweries was not attributed by the defence to be solely due to the acquisition of firms, but rather, to an aggressive sales policy. It was contended that Molson's Brewery Limited and John Labatt Limited remained strong competitors in the area of quality, taste, services and packaging. Since price and distribution were regulated by a Provincial Liquor Control Board, the defence argued that Canadian Breweries Limited could not restrict sources of supply so as to control prices. It was therefore maintained that the merger undertaken by Canadian Breweries did not lead it to act "against the interest of the public." The Court concluded that competition had not been eliminated as a result of the merger and that pricing of the firm's products was completely controlled by the provincial authority. On the basis of these conclusions, the Court's verdict was, not guilty.

Regina v The British Colombia Sugar Refining Company Limited, et al.

The charge against the British Colombia Sugar Refining Company Limited was the second major case dealing with the effect of a merger upon competition and the public interest

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1. Regina v Canadian Breweries Limited: p.19.

to come before the courts. The indictment stated that the British Colombia Sugar Refining Limited[1] and British Colombia Sugar Refinery Limited had between June 1, 1954, and July 13, 1959, acquired control of the Manitoba Sugar Company Limited and that the resulting merger was likely to operate against the public interest. The defence asserted that "...it is not all combines that come within the operations of the Combines Act but only those that have operated, unduly, or are likely to operate unduly to the detriment or against the interest of the public, and that it is for the tribunal of fact, on relevant and admissible evidence to say where the line should be drawn."[2] The Crown considered it obvious that its case "...depends to a great extent, perhaps entirely, on the application of the words 'is likely to operate'."[3]

In determining the degree to which competition had been interfered with, three questions were considered by the Court: first, the effect of the protective tariff on sugar; secondly, the effect of transportation problems and freight rates; and, thirdly, the interest of the sugar beet producers.

The Canadian beet sugar industry is protected by means of tariffs against competition from the importation of

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1. British Colombia Sugar Refining Limited is an operating company owned by British Colombia Sugar Refinery Limited which is a holding company.

2. Regina v the British Colombia Sugar Refining Company Limited, et. al.," Manitoba Court of Queen's Bench, August 8, 1960. Reports of Cases Concerning Combines Held in Various Canadian Courts, Volume 6, p. 9.

3. Ibid. p.26.

raw cane sugar. The Canadian sugar industry as a whole is also protected against imports of refined sugar. A substantial level of effective tariff protection is therefore afforded Canadian sugar producers. This is the case for both the refiners as well as the beet growers. The defence counsel for the accused argued that the price of sugar as set by the refiners was affected by the tariffs and that the merger of the British Colombia Sugar Refining Company and the Manitoba Sugar Company Limited had no effect on pricing. He argued that in deciding the case, only the effect of the merger complained of should be considered by the Court.

With respect to the question of transportation problems and freight rates, the Crown presented the argument that the price charged to jobbers and wholesalers, by the accused was too high. This, they argued, caused retail prices to be too high and was, therefore, a detriment to the consuming public. A basing point system was used where actual price paid was equal to "...the price of refined sugar at the basing point plus the freight from the basing point to the point of destination plus or minus an adjustment."[1] Rail transport was consistently used for shipping sugar. Discount rates applied to rail transport to major points relative to transport to outgoing points. This, therefore, put jobbers at outlying points at a disadvantage relative

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[1] Ibid., p.29. The adjustment refers to the cane/beet differential which arose out of a consumer preference for cane sugar as compared to beet sugar. Cane sugar, therefore, fetched a premium price.

to the jobbers at the main points. The Crown argued that if the price to refineries was established on an f.o.b. basis, a jobber could select the cheapest, most efficient form of transportation to his locale or do his own trucking.

Counsel for the accused firms stated that no evidence existed to support the inference that the basing point system had operated or was likely to operate to the detriment of the public. The defending sugar companies all maintained "...the merger complained of had nothing to do with the adoption, years ago, or with the continuance of use of the basing price method after the merger."[1]

With respect to the question of the interests of the sugar beet producers, the defence counsel pointed out that the growers' interests were entrusted to provincial associations which negotiated yearly contracts with the refineries with respect to quotas and the price of the sugar beets. As well, the associations exercised considerable political influence. The Crown tried to establish that there had been detriment to the producers as a result of the refineries strictly enforcing their grower contracts in 1941 in their refusal to purchase any non-quota production. The Crown pointed out that the accused also refused to release accounting information to the growers. Defence counsel for the accused countered that the enforcement of the contracts was in the producers' interest to guard against over-production

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[1] Ibid., p.32.

and that the accounting question was a matter strictly between the company, the individual grower and the associations, and should not be subject to decision by the Courts.

At the urging of the sugar beet producers, sugar beets and sugar had been covered by the support program of the Agricultural Products Stabilization Act (1957-58). Public policy, by means of tariffs and producer supports tended, therefore, to protect the interests of the beet growers, while possibly being a cause of over-production at various times. The Crown stated, therefore, that in deciding the case, it was necessary to question whether detriment occurred to the beet growers as a result of the sugar refiners activities or whether detriment occurred to the final consumers as a result of the support prices paid to the sugar beet producers.

The Crown also contended that collusion with respect to division of sales territory had occurred between the accused firms and eastern refiners. The defendents countered that even if such an agreement had occurred, it was not the result of the merger complained of. Although the accused appeared to have monopoly power in British Colombia and Alberta, which it later extended to Manitoba as a result of the merger, the Court stated that at no time did anyone else show a desire to enter the sugar refining business in these regions. "There would seem to be no economic reason, except, perhaps, the effects of over-production, to prevent them."[1]

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[1] Ibid., p.52.

The Court concluded that there was no evidence to support the existence of an agreement between the accused and eastern refiners to eliminate competition. Also, "...the Crown has not satisfied [the Court] beyond a reasonable doubt that the "merger, trust or monopoly was operated or was likely to operate to the detriment or against the interest of the public whether consumers, producers, or others." "The verdict of the Court is that the accused are not guilty on each charge."[1]

Conclusion

It has been suggested that the failure of Canadian Combines legislation to effectively monitor undesirable business activity is largely due to the difficulty of making a judicial interpretation of phrases such as "unduly" and "detrimental to the public interest."[2] The Economic Council of Canada in its Interim Report on Competition Policy states: "...Canadian competition policy should aim primarily at bringing about more efficient performance by the economy as a whole."[3] A part of the problem is one of deciding whether combines legislation should be focussed at market structure or market conduct or both in order to achieve the

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1. Ibid., p.57.

2. G. Rosenbluth and Thorburn, Canadian Anti-Combines Administration, 1952-60 (University of Toronto Press),p. 19.

3. Economic Council of Canada, Interim Report on Competition Policy (Ottawa: ECC 1969),p. 9.

desired performance. That report also raised the question of: "If the consumer is obtaining efficient and otherwise satisfactory performance from industry, why should it matter what structures and patterns of buiness conduct, what conditions of competition, lie behind that performance?"[1]

It is suggested by this study that one aspect of "detriment" to the "public interest" might be measured in terms of the performance attributes of price stability and moderate profit rates.[2] The use of these attributes as performance criteria could possibly allow for the widespread existence of oligopolies and possibly even some monopolies, provided that these meet society's objectives and were not "detrimental to the public interest." Operating efficiency resulting from economies of scale could be associated with large firms and could result in the economic performance of these firms being socially desirable. Markham has stated that "...there is a considerable amount of evidence that a large number of small producers of a commodity does not necessarily make for the near-perfectly competitive economy so highly desired."[3] It is maintained in this study that if instead of stressing criteria that are based entirely on industry or firm conduct or structure, performance criteria were

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1. Ibid., p.25.

2. Moderate profit rates implies a level of profits which would be closely related to the general economic concept of normal profits or could be related to the level that society decides is a reasonable rate of return.

3. Jesse W. Markham, "The Effectiveness of the Federal Anti-Trust Laws: Comment," The American Economic Review. 40 (March 1950):167.

developed and the relationship of these to industry (and firm) conduct and structure were identified, this would enable an effective concept of workable competition to be defined in terms of performance norms and would provide more effective criteria for measuring the degree of any detriment to society. By examining the relationship between performance norms and market structure, it might be possible to broadly define market structures which generally conform to the performance norms. If so, those industries which have a structure which was inconsistent with the performance norms could be subjected to closer scrutiny by combines investigators. "Ideally we should like to make a complete analytical chain from market structure, (including conduct) to processes to performance. We would then be able both to deduce present performance from observations of present structure, and to predict what alterations in performance would result from particular changes in structure."[1] At no time should we ignore the question of performance, which ultimately is the most important factor in terms of the public interest.

In the following sections of this study, an attempt is made to examine various relationships between industry structure and performance variables. It was hoped that this might provide some information which could be used to determine if any general industry structures are likely to give

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[1] Carl Kaysen and Donald F. Turner, Anti-Trust Policy: An Economic and Legal Analysis (Cambridge: Harvard University Press, 1965),p.60.

rise to desired performance norms. Successful delineation of such relationships could be of use in formulating a concept of workable competition. Deviations from such a concept could be the basis for designing future combines legislation.

Chapter 4

PRICE STABILITY, PRICE-COST MARGINS AND TARIF LEVELS: RELATIONSHIPS WITH THE LEVEL OF CONCENTRATION

Introduction

The purpose of this chapter will be to examine the relationship of price stability, price-cost margins and tariff levels to the level of concentration. Four hypotheses will be examined. First, that the relationship between concentration and the level of price stability is greatest within the medium range of concentration. Price stability will be examined as a function of concentration. This examination is applied over the total range as well as selected ranges of concentration. The second hypothesis is that the level of profits is a function of the level of concentration. According to this hypothesis, we would expect profit levels to be higher at higher levels of concentration. The third hypothesis and relationship to be tested relates to concentration, the degree of price stability, and the level of profits. One would expect that as concentration increases, prices would tend to be more stable as a result of larger firms in more concentrated industries being more easily able to adjust internally to market fluctuations. In the long run, the stability of prices in larger firms may enable firms to maintain profits at levels higher than is the case for smaller firms in less concentrated industries. Price stability is expected to be associated with greater

fluctuation in profit levels and, therefore, the long-run profit levels would be likely to be higher than under conditions of price instability. A fourth hypothesis tested in this study is that the degree of tariff protection afforded food manufacturing industries has promoted concentration by restricting the impact of imports on domestic production.

The Data

Concentration Ratios

Examination of the relationships between price stability, price-cost margins, tariff levels, and concentration was somewhat hindered by the lack of time series concentration data for Canadian industries. Concentration data for 1965 were obtained from a Department of Consumer and Corporate Affairs study.[1] Estimates based on simple proportions were calculated for those industries for which concentration ratios were unavailable[2] because of secrecy

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[1] Department of Consumer and Corporate Affairs, Concentration in the Manufacturing Industries of Canada (Ottawa: 1971).

[2] For example, if 13 establishments accounted for 100% of the total value of factory shipments, then 9 establishments were assumed to account for 69% of the total value of factory shipments. This method assumes that the total value of factory shipments is distributed proportionately among the establishments in an industry. Although this may seem unrealistic, no adequate criterion for weighing establishments on a different basis was available. The estimated concentration ratios were calculated for sugar refineries, macaroni manufacturers, breakfast cereal manufacturers, and vegetable oil mills. As noted later in the study, all the postulated models were tested twice, first, including the estimated concentration ratios and, second, excluding these estimated concentration ratios. In view of the limitations of the estimating procedure, caution should be used in interpreting those parts of the analysis which include the estimated concentration ratios.

provisions which restrict the publication of data from which specific information with respect to a given firm may be inferred (see Table 1). The year 1965 for which the concentration data apply was assumed to be representative of the period 1960-71. This appears to be a reasonable assumption. Initially it was intended that the study would cover the period from 1960-74, but examination of the wholesale price index data revealed extreme fluctuations during the period 1972-74. It appeared that these price data for the period 1972-74 were unrepresentative of the earlier period for which concentration data were available, and so the study initially concentrated on the analysis of data for 1960-71 (see Appendix A). In addition, the models were also tested using available data for the period 1972-74 to determine whether the earlier relationships also applied during the more recent inflationary period.

The assumption that 1965 concentration data are representative of the period 1960-72 appears to be justified based on observation of the trend in total establishment numbers over the relevant time period 1960-72 (see Table 2). This trend shows a general downward tendency in the number of establishments for the industries covered by the study. Since the total market size has not declined but has increased, this feature implies that fewer firms have maintained or increased their market share and, therefore, that industry concentration ratios increased over time. This tendency can also be observed over a longer period by

TABLE 1

CONCENTRATION LEVELS IN THE CANADIAN FOOD MANUFACTURING INDUSTRIES,1965

S.I.C. NO.	INDUSTRY	PERCENT OF TOTAL VALUE OF FACTORY SHIPMENTS (AND NUMBER OF ESTABLISHMENTS) ACCOUNTED FOR BY THE		
		4	8	12
		LARGEST ENTERPRISES		
1010	SLAUGHTERING & MEAT PROCESSORS	58.07 (29)	67.58 (38)	71.48 (42)
1030	POULTRY PROCESSORS	24.19 (8)	37.65 (17)	48.61 (21)
1060	DAIRY FACTORIES & PROCESS CHEESE MANUFACTURERS	25.13 (63)	34.81 (115)	40.86 (179)
1110	FISH PRODUCTS INDUSTRY	37.09 (37)	52.10 (54)	58.64 (61)
1120	FRUIT AND VEGETABLE CANNERS	39.27 (23)	52.02 (38)	59.34 (44)
1230	FEED MANUFACTURERS	28.10 (39)	38.09 (79)	43.31 (91)
1240	FLOUR MILLS	79.65 (18)	90.18 (23)	94.95 (27)
1250	BREAKFAST CEREAL MANUFACTURERS	[30]* (5)	[59] (10)	[82] (14)
1280	BISCUIT MANUFACTURERS	67.29 (12)	83.61 (17)	90.77 (21)
1290	BAKERIES	32.26 (66)	43.89 (81)	49.52 (89)
1310	CONFECTIONARY MANUFACTURERS	46.65 (8)	65.41 (14)	75.28 (19)
1330	SUGAR REFINERIES	[69] (9)	100.00 (13)	- -
1350	VEGETABLE OIL MILLS	[42] (5)	[83] (10)	- -
1391	MACARONI MANUFACTURERS	[35] (5)	[63] (9)	98.49 (14)
1392	MISCELLANEOUS FOOD MANUFACTURERS	32.79 (19)	48.37 (27)	57.40 (35)
1410	SOFT DRINK MANUFACTURERS	40.86 (42)	48.03 (51)	53.06 (60)
1430	DISTILLERIES	84.23 (10)	96.38 (17)	- (21)
1450	BREWERIES	94.57 (41)	99.65 (49)	- -
1470	WINERIES	71.18 (9)	94.96 (14)	- (18)

*[ ] Estimates based on simple proportions.

SOURCE: Department of Consumer and Corporate Affairs, Concentration In The Manufacturing Industries of Canada (Ottawa 1971) pp.56-57, Table A-1.

TABLE 2

COMPARISON OF ESTABLISHMENT NUMBERS FROM 1960-72 FOR THE CANADIAN FOOD MANUFACTURING INDUSTRIES

S.I.C. NO.	INDUSTRY	YEAR												
		1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972
		NUMBER OF ESTABLISHMENTS												
1010	SLAUGHTERING & MEAT PROCESSORS	313	344	351	363	378	399	431	442	433	448	453	460	468
1030	POULTRY PROCESSORS	N/A*	205	181	163	163	150	142	126	115	109	102	104	98
1060	DAIRY FACT. & PROCESS CHEESE	N/A	1740	1677	1614	1544	1421	1316	1184	1046	958	N/A	N/A	N/A
1110	FISH PRODUCTS	387	339	357	365	371	376	365	372	367	350	344	348	350
1120	FRUIT & VEGETABLE CANNERS	337	335	340	334	326	313	314	311	295	284	238	226	215
1230	FEED MANUFACTURERS	970	954	920	922	890	855	860	892	872	832	789	786	731
1240	FLOUR MILLS	55	54	55	53	55	51	52	51	42	41	N/A	N/A	N/A
1250	BREAKFAST CEREAL MANUFACTURERS	20	19	19	18	17	17	16	17	18	16	N/A	N/A	N/A
1280	BISCUIT MANUFACTURERS	48	48	46	46	45	44	45	46	47	45	42	44	43
1290	BAKERIES	2539	2600	2628	2571	2548	2465	2363	2275	2135	2030	1921	1824	1811
1310	CONFECTIONARY MANUFACTURERS	206	194	190	181	176	180	170	165	155	147	139	129	124
1330	SUGAR REFINERIES	12	11	11	11	13	13	13	13	13	14	14	N/A	N/A
1350	VEGETABLE OIL MILLS	11	12	12	14	12	12	12	12	11	10	10	10	10
1391	MACARONI MANUFACTURERS	17	18	19	18	19	19	19	19	19	N/A	N/A	N/A	N/A
1392	MISC. FOOD MANUFACTURERS	272	268	279	274	281	272	269	266	256	282	275	283	281
1410	SOFT DRINK MANUFACTURERS	512	502	506	492	481	470	460	454	441	422	395	385	363
1430	DISTILLERIES	19	18	19	20	20	22	23	23	25	26	27	29	29
1450	BREWERIES	54	54	50	50	51	52	52	48	47	45	42	41	42
1470	WINERIES	19	20	20	19	17	19	23	24	24	23	22	23	28

* N/A - Not Available.

SOURCE: Statistics Canada, General Review of the Manufacturing Industries of Canada. Cat. No. 31-203, 1961-73.

comparing the year 1948 (for which concentration data are also available)[1] to 1965 levels (see Table 3). The general direction of change has been towards declining establishment numbers and increased concentration ratios over time. The bias in this study should not be excessive since the year 1965 is towards the mid-range of the time period being studied. Any bias which does occur is likely to result in an uncerstatement of the actual impact of the associated variables upon the level of concentration.

Price Stability Indices

A measure of price stability was generated from time series data of price indices. Industry selling price indices rather than retail prices were used as the basis of this measure.[2] The percentage change between each year in the average annual price indices was calculated and the standard deviations of these changes were determined to give a measure of price stability for each industry considered. The price stability index for each industry is shown in Table 4. (Also see Appendix B.) This price

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1. These indices were calculated by Gideon Rosenbluth, and are presented in CCA, Concentration in the Manufacturing Industries of Canada, p. 45.

2. Statistics Canada, Prices and Price Indexes, Cat. No. 62-002, 1961-75.

TABLE 3

COMPARISON OF CONCENTRATION LEVELS IN THE
CANADIAN FOOD MANUFACTURING INDUSTRIES 1948 AND 1965

S.I.C.	S.I.C.	1965 INDUSTRY	TOTAL VALUE ADDED $ Millions		NUMBER OF LARGEST UNITS ACCOUNTING FOR 80% OF EMPLOYMENT			
					1948		1965	
1948	1965	NAME	1948	1965	FIRMS	ESTABLISHMENTS	ENTERPRISES	ESTABLISHMENTS
210	1110	FISH PRODUCTS INDUSTRY	39.5	90.5	132.5	173.9	40.50	89.21
212	1120	FRUIT & VEG. CANNERS	64.8	176.1	72.3	155.0	42.70	78.00
214	1240	FLOUR MILLS	39.3	48.5	22.0	32.9	3.46	26.08
218	1280	BISCUIT MANUFACTURERS	24.9	54.6	11.1	18.2	7.80	17.42
225	1310	CONFECTIONARY MANUF.	45.4	91.6	23.4	29.1	16.83	25.24
227	1330	SUGAR REFINERIES	22.7	52.0	4.1	5.8	3.13	7.35
387	1350	VEGETABLE OIL MILLS	11.9	10.6	7.0	9.0	5.76	6.73
228	1391	MACARONI MANUFACTURERS	2.8	9.8	5.6	6.8	4.15	5.82
220	1410	SOFT DRINK MANUF.	40.7	143.2	149.2	191.8	121.82	175.90
221	1430	DISTILLERIES	45.0	157.6	2.5	7.3	5.33	14.16
222	1450	BREWERIES	89.8	213.6	8.6	26.9	2.58	23.84
224	1470	WINERIES	5.3	12.5	9.1	12.8	5.57	9.28

SOURCE: Rosenbluth as quoted in: Department of Consumer and Corporate Affairs, Concentration in the Manufacturing Industries of Canada (Ottawa; 1971), p.45, Table V-4.

stability measure refers to the deviations from any trend in the industry selling price indices. An alternative measure would be to use the variation around the average of the selling price indices as the measure of price stability. The implication of the measure used in this study is that industries which have experienced similar annual percentage changes in price over time are considered to exhibit greater price stability than those industries which experience more erratic fluctuations in annual selling price indices. The price stability measure used in the study seems reasonable from the viewpoint of the consumer in that the consumer's ability to predict the future price of a commodity will be somewhat dependent upon the trend in past pricefluctuations associated with the commodity. So, an industry which experiences equal annual percentage changes in price over time may be unstable with respect to the average price level, but the pattern and predictability of this industry's prices will be relatively stable relative to an industry which has a more inconsistent and unpredictable pattern of price changes, even though the deviation from the average price level may be smaller. Therefore, the price stability indices chosen for this study refer to the variation in the rate of change in price levels rather than to the variation in average price levels.

Price-Cost Margins

To determine profit levels, Collins and Preston[1]

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[1] Norman R. Collins and Lee E. Preston, Concentration and Price-Cost Margins in Manufacturing Industries (Berkeley: University of California Press, 1968).

TABLE 4

PRICE STABILITY INDICES FOR THE CANADIAN FOOD MANUFACTURING INDUSTRIES

S.I.C. NO.	INDUSTRY	STANDARD DEVIATIONS OF ANNUAL PRICE CHANGES[a]	
		1960-71	1972-74
1010	SLAUGHTERING & MEAT PROCESSORS	6.23	10.98
1030	POULTRY PROCESSORS	9.57	11.15
1060	DAIRY FACTORIES & PROCESS CHEESE MANUF.	2.19[b]	N/A
1110	FISH PRODUCTS INDUSTRY	3.30	7.45
1120	FRUIT & VEGETABLE CANNERS	1.56	7.04
1230	FEED MANUFACTURERS	3.33	22.01
1240	FLOUR MILLS	3.65	14.20
1250	BREAKFAST CEREAL MANUFACTURERS	1.38	7.13
1280	BISCUIT MANUFACTURERS	2.64	11.93
1290	BAKERIES	2.03	8.04
1310	CONFECTIONARY MANUFACTURERS	3.54	16.51
1330	SUGAR REFINERIES	29.90[c]	71.33
1350	VEGETABLE OIL MILLS	6.90	51.84
1391	MACARONI MANUFACTURERS	2.50	11.13
1392	MISC. FOOD MANUFACTURERS	2.97	11.67
1410	SOFT DRINK MANUFACTURERS	4.77	8.46
1430	DISTILLERIES	1.36	.60
1450	BREWERIES	1.46	10.52
1470	WINERIES	1.91	3.42

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[a] Calculated from the percentage change between each year in the average annual price indices.

[b] Average of standard deviations for Dairy Factories and Process Cheese Manufacturers.

[c] The wide variation in the annual percentage change in the selling price indices associated with the sugar refining industry may be a reflection of this industry's reliance on imported raw cane sugar.

SOURCE: Statistics Canada, Prices and Price Indexes, Cat. No. 62-002, 1961-75. (See Appendix B.)

technique of using price-cost margins as a proxy for profits was used due to the lack of availability of comparable profit data.[1] Collins and Preston, in examining the relationships of different profitability measures to concentration state: "...the major conclusion from this analysis is that the profitability measures are moderately well correlated and that the margin index is associated with average concentration levels in substantially the same way as are the other measures of profitability."[2] Unlike Collins and Prestons study, this study used cost data for the manufacturing activity rather than total activity in calculating price-cost margins as the underlying question is whether the manufacturing activity of specific industries is favorable in terms of the concept of workable competition. The concept gives a basis for attempting to determine desirable concentration levels.

The price-cost margin for each industry was

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[1] Profitability may be measured in a number of ways. It may be expressed as a return on equity, or as the excess of return over sales, or as the rate of earning before interest on investment. These various measures may differ due to differences in equity, volume of sales, etc., and therefore may not be comparable for different firms. Price-cost margins give a consistent and comparable measure of profitability. Although price-cost margins may reflect differences in capital-labor ratios rather than differences in profits, the production functions associated with the food manufacturing industries are likely similar. Therefore, price-cost margins should provide a good comparable measure of profitability.

[2] IBID. p.69

calculated as: $\frac{\text{value added-wages,}}{\text{value of shipments}}$ for each year. Value added is determined as the value of shipments plus the net change in inventory less the costs of materials and supplies, fuel and electricity. The annual price-cost margins for each industry were then used to calculate an average price-cost margin for the industry over the time period 1960-71. Price-cost data for 1972 were the most recent available and were therefore used to calculate price-cost margins representative of the inflationary period from 1972 to 1974.[1] The price-cost margin estimates are shown in Table 5. (Also see Appendix C)

Tariff Rates

Data on the level of tariff protection for each industry were those calculated by Wilkinson and Norrie.[2] They include nominal and effective tariff rates for the years 1961, 1966, and 1970 (see Table 6).[3]

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[1] Statistics Canada, Manufacturing Industries of Canada, Catalogue No. 31-203, 1961-73.

[2] Bruce W. Wilkinson and Ken Norrie, (Economic Council of Canada), Effective Protection and the Return to Capital (Ottawa: Information Canada, 1975).

[3] Data for the brewery, distillery, winery and macaroni manufacturing industries were not available from the above study.

TABLE 5

PRICE-COST MARGIN ESTIMATES FOR CANADIAN FOOD MANUFACTURING INDUSTRIES

S.I.C. NO.	INDUSTRY	PRICE-COST MARGINS[a] AVERAGE 1960-71	1972
1010	SLAUGHTERING & MEAT PROCESSORS	.11	.10
1030	POULTRY PROCESSORS	.09	.11
1110	FISH PRODUCTS INDUSTRY	.19	.22
1120	FRUIT & VEGETABLE CANNERS	.29	.28
1230	FEED MANUFACTURERS	.16	.16
1240	FLOUR MILLS	.15	N/A
1250	BREAKFAST CEREAL MANUFACTURERS	.48	N/A
1280	BISCUIT MANUFACTURERS	.35	.33
1290	BAKERIES	.35	.33
1310	CONFECTIONARY MANUFACTURERS	.34	.35
1330	SUGAR REFINERIES	.25	.20
1350	VEGETABLE OIL MILLS	.11	.11
1391	MACARONI MANUFACTURERS	.33	N/A
1392	MISC. FOOD MANUFACTURERS	.33	.35
1410	SOFT DRINK MANUFACTURERS	.52	.42
1430	DISTILLERIES	.63	.66
1450	BREWERIES	.62	.63
1470	WINERIES	.45	.43

[a] Price-cost margins = $\frac{\text{value added-wages}}{\text{value of shipments}}$.

SOURCE: Statistics Canada, Manufacturing Industries of Canada, Cat. No. 31-203, 1961-73. (See Appendix C.)

TABLE 6

NOMINAL AND EFFECTIVE TARIFF RATES FOR THE CANADIAN FOOD MANUFACTURING INDUSTRIES, 1961, 1966, AND 1970 (PERCENTAGES)

S.I.C. NO.	INDUSTRY	NOMINAL TARIFF RATES 1961	1966	1970	EFFECTIVE TARIFF RATES 1961	1966	1970
1010	SLAUGHTERING & MEAT PROCESSORS	6.06	4.21	4.72	17.21	6.45	9.76
1030	POULTRY PROC.	13.22	12.14	11.60	49.52	42.65	40.37
1060	DAIRY FAC.	8.74	12.56	14.02	33.92	44.65	49.13
	PROCESS CHEESE MAN.	10.26	9.09	8.44	15.18	13.38	11.92
1110	FISH PRODUCTS IND.	11.73	12.66	8.07	15.89	34.29	23.25
1120	FRUIT & VEG. CANNERS	14.79	13.89	12.12	21.77	24.38	20.49
1230	FEED MILLS	11.68	8.02	6.37	32.00	22.58	16.78
1240	FLOUR MILLS	10.41	1.82	0.95	45.24	6.36	-1.37
1250	BREAKFAST CERAL MANUF.	18.36	15.89	14.32	32.40	30.04	26.49
1280	BISCUIT MANUF.	9.69	7.98	5.52	7.98	9.26	4.47
1290	BAKERIES	15.38	14.85	8.83	20.38	23.98	13.06
1310	CONFECTIONARY MANUF.	13.89	12.99	11.08	19.96	20.09	15.38
1330	SUGAR REFINERIES	21.80	14.55	11.50	56.15	37.35	29.49
1350	VEG. OIL MILLS	3.03	3.18	1.99	29.26	35.19	19.56
1392	MISC. FOOD MANUF.	12.20	8.86	5.61	27.80	19.31	9.95
1410	SOFT DRINK MANUF.	2.24	6.86	3.30	-1.27	7.32	0.41

SOURCE: Bruce W. Wilkinson and Ken Norrie (Economic Council of Canada), Effective Protection and the Return to Capital (Ottawa: Information Canada, 1975), Table 3-1 and Table A-1.

The Models

Concentration and Price Stability

A simple linear relation between concentration and price stability was initially assumed in testing whether there was any evidence of greater price stability as concentration increased. The estimating equation tested was:

$$Y = a + BX_1 \quad \ldots \qquad (1)$$

where Y = price stability indices
and X_1 = concentration ratios.

This formulation assumes that price stability is dependent on and affected by the level of concentration. The regression was tested over 4, 8, and 12 firm concentration ratio data. These initial regressions were tested over the 19 industries including those for which concentration ratios were unavailable and therefore estimated. (See Table 1)

To determine if the inclusion of the estimated concentration ratios for four industries biased the results, equations (1) were rerun using only the non-estimated concentration ratios. The regression was again tested over 4, 8, and 12 firm concentration ratio data.

Regressions of the log-linear form:

$$\log Y = \log a + B \log X_1 \quad \ldots \qquad (2)$$

where Y = pure stability indices
and X_1 = concentration ratios

were also tested to determine if the results differed from equation (1). As before, the regression was tested over the 4, 8, and 12 firm concentration ratio data. It was tested including the estimated concentration ratios and repeated using only the non-estimated concentration ratios.

In order to test the first hypothesis that the level of price stability is greatest within the medium range of concentration, it was necessary to segregate the concentration ratios into "high", "medium" and "low" ranges. "High" concentration was defined as a 4-firm concentration ratio greater than 65. "Medium" concentration was defined as a 4-firm concentration ratio between 30 and 65. And "low" concentration was defined as a 4-firm concentration ratio which is less than 30. Equation (1) was retested for each of these ranges of concentration to determine if there was a stronger relation between price stability and concentration ratios in the "medium" range of concentration than there was in the "high" and "low" ranges of concentration. Again, the regression was tested including and excluding the estimated concentration ratios.

Concentration and Price-Cost Margins

Table 5 shows the average of the annual price-cost margins for each industry for 1960-71. The relationship of these averages with the 1965 4-firm concentration ratio data was tested using equation (1) where the variables were

redefined such that:

Y = average price-cost margin measures
and X_1 = concentration ratios.

This formulation assumes that the price-cost margin is dependent on and affected by the level of concentration.

The relationship was also tested using the log-linear formulation of equation (2) where, again

Y = average price-cost margin measures;
and X_1 = concentration ratios,

to determine if there was an indication of this log-linear form of relationship between the variables of price-cost margins and the 1965 concentration ratios.

The relationship between price-cost margins and concentration within the "high", "medium" and "low" ranges of concentration was also examined, assuming a linear form of relationship between these variables (as in equation (1)) to determine whether food manufacturing industries within these specific concentration ranges were associated with higher or lower levels of profit.

The regression equations were tested twice in order to both include and exclude the estimated concentration ratios.

The above relationships were also tested using the 1972 price-cost margin data to determine if the relationships differed during that year.

Concentration, Price Stability and Price-Cost Margins

Having examined the impact of concentration upon price stability and the level of profits independently, it was decided to apply a linear multiple regression test to determine the joint effect of the degree of price stability as well as the profit level in explaining variability within the 1965 concentration ratios. The equation tested was

$$Y = a + B_1X_1 + B_2X_2 \quad \ldots \qquad (3)$$

where Y = concentration ratios,

X_1 = price stability measures,

and X_2 = average price-cost margin measures.

The model was tested in two forms, first, including; and, second, excluding the estimated concentration ratios.

Equation (3) was also tested for each of the "high", "medium" and "low" ranges of concentration to determine the extent which price stability and price-cost margins explained the variability in concentration ratios of food manufacturing industries within these given ranges. Concentration was assumed to be the dependent variable (Y), while price stability and price-cost margins were assumed to be independent variables (X_1 and X_2). The regressions were tested including and excluding the estimated concentration ratios.

Concentration and Tariff Rates

Examination of the relationship of tariff rates to the 1965 concentration ratios for the Canadian food manufacturing industries was done by testing a model formulated as was equation (1) where the variables were redefined as:

Y = concentration ratios

and X_1 = tariff rate measures.

The model was tested using both nominal tariff data and effective tariff data for each of the years 1961, 1966 and 1970. All regressions were tested both including and excluding the estimated concentration ratios.

Tariff Rates and Price-Cost Margins

Two regression models were tested to determine if there was any apparent relationship between the price-cost margins for the various food manufacturing industries and the associated nominal tariff and effective tariff rates for the years 1961, 1966 and 1970. A model formulated as was equation (1) was tested where the variables were defined as:

Y = average price-cost margin measures

and X_1 = tariff rate measures.

This formulation involves the assumption that price-cost margins are dependent on and affected by the level of tariffs.

An equation of the form of equation (2) was also tested on the price-cost margin and tariff rate data to

determine whether there was any evidence of a log-linear form of relationship between these variables (price-cost margins and tariff rates).

Concentration, Price Stability, Tariff Rates and Price-Cost Margins

A final series of multiple regressions of the form:

$$Y = a + B_1X_1 + B_2X_2 + B_3X_3 \quad \ldots \tag{4}$$

where Y = average price-cost margin measures,

X_1 = concentration ratios,

X_2 = price stability measures,

and X_3 = tariff rate measures,

were tested in an effort to determine the combined impact of the three explanatory variables on the level of profits. The model was tested including and excluding the estimated concentration ratios.

A second series of log-linear regressions of the form:

$$\log Y = \log a + B_1\log X_1 + B_2\log X_2 + B_3\log X_3 \tag{5}$$

where Y = average price-cost margin measures,

X_1 = concentration ratios,

X_2 = price stability measures,

and X_3 = tariff rate measures,

were also tested in an attempt to determine the extent of any joint effect of the above three explanatory variables on the levels of profits as measured by price-cost margins.

The Results

Concentration and Price Stability

Analysis of the level of price stability from 1970 to 1971 expressed as a function of the 1965 concentration ratios for the Canadian food manufacturing industries applied to the 4, 8, and 12 firm concentration levels (see Table 7). The estimated coefficients of equation (1) when the estimated concentration ratio data were included were: 0.03455, 0.07607 and -0.02228 for the 4, 8, and 12 firm concentration variables, respectively. Application of t-tests reveal these all to be statistically nonsignificant at the 90% level.

When equation (1) was tested using the 1960-71 price stability indices and using only the non-estimated 4, 8, and 12 firm concentration ratio data, the estimated coefficients were -0.04095, 0.0691, and 0.02771, respectively. The t-tests again revealed each of these to be statistically nonsignificant at the 90% level.

The relationship between 1960-71 price stability indices and the 4, 8, and 12 firm concentration ratios were also tested using equation (2). In this case the t-tests also showed the estimated coefficients to be statistically nonsignificant at the 90% level (see Table 7).

In comparing the estimated coefficients for the tests which included and those which excluded the estimated concentration ratios, it is seen that these were relatively

TABLE 7

RESULTS: THE RELATIONSHIP BETWEEN CONCENTRATION AND PRICE STABILITY

A: $Y = a + BX_1$, WHERE Y = PRICE STABILITY (1960-71), X_1 = CONCENTRATION ;

CONCENTRATION DATA		INTERCEPT (a)	ESTIMATED COEFFICIENT (B)	STANDARD ERROR OF ESTIMATED COEFFICIENT	t-VALUE	R^2	F-VALUE	STANDARD ERROR OF EQUATION
4-FIRM CONCENTRATION	INC. ESTIMATED CONCENTRATION RATIOS	3.11404	.03455	.07077	.49	.0134	.24	6.57903
	EXCLUDING ESTIMATED CONCENTRATION RATIOS	5.62454	-.04095	.02498	-1.64	.1829	2.69	2.07315
8-FIRM CONCENTRATION	INC. ESTIMATED CONCENTRATION RATIOS	-.22182	.07607	.06594	1.15	.0726	1.33	6.37971
	EXCLUDING ESTIMATED CONCENTRATION RATIOS	.54344	.0691	.08073	.86	.0534	.73	7.21598
12-FIRM CONCENTRATION	INC. ESTIMATED CONCENTRATION RATIOS	5.01691	-.02228	.03119	-.71	.0408	.51	2.19235
	EXCLUDING ESTIMATED CONCENTRATION RATIOS	5.68992	-.02771	.03496	-.79	.0591	.63	2.22371

B: LOG Y = LOG a + B LOG X_1, WHERE Y= PRICE STABILITY (1960-71), X_1 = CONCENTRATION:

CONCENTRATION DATA		INTERCEPT (LOG a)	ESTIMATED COEFFICIENT (B)	STANDARD ERROR OF ESTIMATED COEFFICIENT	t-VALUE	R^2	F-VALUE	STANDARD ERROR OF EQUATION
4-FIRM CONCENTRATION	INC. ESTIMATED CONCENTRATION RATIOS	1.6558	-.00238	.13781	-.02	0	0	.19315
	EXCLUDING ESTIMATED CONCENTRATION RATIOS	1.81509	-.32573	.22051	-1.48	.1435	2.18	.19062
8-FIRM CONCENTRATION	INC. ESTIMATED CONCENTRATION RATIOS	1.77851	.0325	.1133	.29	.0048	$.0\overset{8}{1}$	.15879
	EXCLUDING ESTIMATED CONCENTRATION RATIOS	1.78376	.00973	.13181	.07	.0004	.01	.17196
12-FIRM CONCENTRATION	INC. ESTIMATED CONCENTRATION RATIOS	1.84268	-.08276	.16145	-.51	.0214	.26	.13113
	EXCLUDING ESTIMATED CONCENTRATION RATIOS	1.80549	-.0233	.18447	-.13	.0014	.02	.13386

* signifies significance at the 90% level of confidence.
** signifies significance at the 95% level of confidence.
*** signifies significance at the 98% level of confidence.
**** signifies significance at the 99% level of confidence.

stable. This feature applied to the estimated coefficients for each of the 4, 8 and 12 firm concentration ratio variables. However, the t-values of the estimated coefficient for the 4 firm concentration ratio variable using data which excluded the estimated concentration ratios were higher than the corresponding t-values for the 8 and 12 firm concentration ratio variables. From observing the concentration ratios data, it also appears that as the number of firms in an industry increases, there is a tendency for the 8 and 12 firm concentration ratios to change, indicating a more dispersed industry. This occurs because each additional firm considered has a relatively smaller share of the market. For purposes of policy determination with respect to oligopoly and anti-combines legislation, the 8 and 12 firm concentration ratios, therefore, may be less useful than the 4 firm concentration ratios. This feature may be particularly relevant for Canada where absolute market size is relatively small. On this basis, it was decided to continue the analysis utilizing only the 4-firm concentration ratios.

Finding no strong relationship between the extent of price stability and the level of concentration, it was decided to examine the possibility that concentration within either the "high", "medium" or "low" range of concentration might show a relationship to price stability. The results using equation (1) where the variables were redefined such that:

Y = price stability measures
and X_1 = concentration ratios

show that the estimated coefficient for the "medium" range of concentration, which included the estimates of concentration ratios was 0.16273 (see Table 8). The t-test shows this to be statistically significant at the 98% confidence level. The estimated coefficients for the "high" and "low" ranges were -.43006 and -1.11832, respectively, both of which were nonsignificant at the 90% level.

When the model was tested excluding the estimated concentration ratios, the regression for the "medium" range of concentration yielded an estimated coefficient of .13943. This was statistically significant at the 95% level. The "high" range yielded an estimated coefficient of -.0354 which was nonsignificant at the 90% level. In the "low" range of concentration the sample was too small to allow any meaningful conclusion.

An equation of the general form of equation (1) was used to determine the extent of any relationship between the price stability indices calculated for the 1972-74 period and the 4-firm concentration ratio data for 1965. Price stability was assumed to be the dependent variable (Y) and concentration was assumed to be the independent variable (X_1). When the model was tested using data which included the estimated concentration ratios, the estimated coefficient was 0.0438. This was statistically nonsignificant at the 90%

TABLE 8

RESULTS: THE RELATIONSHIP BETWEEN CONCENTRATION AND PRICE STABILITY WITHIN THE "HIGH", "MEDIUM" AND "LOW" RANGES OF CONCENTRATION

A: $Y = a + BX_1$ WHERE Y = PRICE STABILITY (1960-71), X_1 = CONCENTRATION:

CONCENTRATION DATA	RANGE OF CONCENTRATION	INTERCEPT (a)	ESTIMATED COEFFICIENT (B)	STANDARD ERROR OF ESTIMATED COEFFICIENT	t-VALUE	R^2	F-VALUE	STANDARD ERROR OF EQUATION
INCLUDING ESTIMATED CONCENTRATION RATIOS	"HIGH"	40.33251	-.43006	.49943	-.86	.1564	.74	11.61773
EXCLUDING ESTIMATED CONCENTRATION RATIOS		5.06792	-.0354	.04346	-.81	.1811	.66	.93983
INCLUDING ESTIMATED CONCENTRATION RATIOS	"MEDIUM"	-2.89615	.16273	.05664	2.87***	.5078	8.25***	1.4111
EXCLUDING ESTIMATED CONCENTRATION RATIOS		-2.23454	.13943	.0489	2.85**	.6192	8.13**	1.07989
INCLUDING ESTIMATED CONCENTRATION RATIOS	"LOW"	33.89019	-1.11832	1.59328	-.70	.3301	.49	4.59872
EXCLUDING ESTIMATED CONCENTRATION RATIOS		A	A	A	A	A	A	A

A. insufficient sample size

confidence level (see Table 9). The model was also tested excluding the estimated concentration ratios data and the estimated coefficient again was statistically nonsignificant at the 90% level.

A chi-square test was also performed on the average of the price stability indices for the industries included in each range of concentration, excluding those industries for which estimated concentration ratios had been generated. The test revealed that at the 90% confidence level there was a significant difference in the average price stability indices for each range of concentration and that the differences were not due simply to random fluctuations (see Appendix D). This is generally consistent with the results from the regression models.

The relationship between the 1972-74 price stability indices and the 1965 concentration ratios data was tested using a long-linear equation of form (2). The model was tested including the estimated concentration ratios and excluding these estimates. In both cases the estimated coefficient on the price stability variable was statistically nonsignificant at the 90% level (see Table 9).

When an equation of form (1) was tested using the 1972-74 price stability indices and the "high" and "medium" ranges of concentration, the estimated coefficients were all statistically nonsignificant at the 90% level, as shown in Table 9.

TABLE 9

RESULTS: THE RELATIONSHIP BETWEEN CONCENTRATION AND PRICE STABILITY

A: $Y = a + BX_1$, WHERE Y = PRICE STABILITY (1972-74), X_1 = CONCENTRATION:

CONCENTRATION DATA	INTERCEPT (a)	ESTIMATED COEFFICIENT (B)	STANDARD ERROR OF ESTIMATED COEFFICIENT	t-VALUE	R^2	F-VALUE	STANDARD ERROR OF EQUATION
INCLUDING ESTIMATED CONCENTRATION RATIOS	13.63335	.0438	.2019	.22	.0029	.05	18.12282
EXCLUDING ESTIMATED CONCENTRATION RATIOS	25.74808	.4272	1.0252	.42	.08	.17	7.139207

B: $Y = a + BX_1$, WHERE Y = PRICE STABILITY (1972-74), X_1 = CONCENTRATION:

CONCENTRATION DATA	RANGE OF CONCENTRATION	INTERCEPT (a)	ESTIMATED COEFFICIENT (B)	STANDARD ERROR OF ESTIMATED COEFFICIENT	t-VALUE	R^2	F-VALUE	STANDARD ERROR OF EQUATION
INCLUDING ESTIMATED CONCENTRATION RATIOS	"HIGH"	90.58576	-.9242	1.1776	-.78	.13	.62	27.39445
EXCLUDING ESTIMATED CONCENTRATION RATIOS		9.134928	.0126	.3111	.04	0	0	6.728238
INCLUDING ESTIMATED CONCENTRATION RATIOS	"MEDIUM"	1.08313	.3823	.5674	.58	.04	.33	14.13614
EXCLUDING ESTIMATED CONCENTRATION RATIOS		3.920044	.1488	.1531	.97	.16	.95	3.372039

The overall conclusion from this section of the study is that the price stability variable is significantly related to concentration only in the "medium" range of concentration. This relationship applies during periods of relative economic stability. This implies that as the level of concentration increases for industries in the "medium" range of concentration that one might expect less variation in the annual percentage change in price over time. This may be due to the trend toward oligopoly typical of the industries in this concentration range, leading to a lack of competition or this feature may be due to random market disturbances which have less of an impact on this group of firms because of internal adjustments.[1] If there is lack of competition, one would expect this group of firms to have higher levels of profit over time than would firms which are experiencing the effects of price competition. However, if price stability is due to the ability to adjust to market fluctuations, then profits should tend to be more moderate although they would likely exceed the level of profits observed under conditions of pure competition where low concentration ratios apply.

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[1] One of these possibilities is Eichner's theory of investment behavior as discussed in Chapter 2 (Alfred S. Eichner, A Theory of the Determination of the Mark-Up Under Oligopoly, Economic Journal, 83: 332).

Concentration and Price Cost Margins

Firms in highly concentrated industries are likely to have high profit levels due to their market power. Price instability could arise from these firms adjusting prices to any changes in the market in an attempt to maintain higher than normal profits over time. One would expect that as the level of concentration in an industry increases, profit levels would also increase due to the increased ability of larger firms to restrict supply and manipulate prices so as to maintain profits. To test this hypothesis the relationship of price-cost margins to the 1965 levels of concentration was tested. The results (see Table 10) including the estimated concentration ratios show an estimated coefficient of 0.00456 for the price-cost margin variable. This is significant at the 98% confidence level. When the model was tested excluding the estimated concentration ratio data, the results showed an estimated coefficient of 0.00423, significant at the 95% confidence level.

When the relationship of price-cost margins within the "high" and "medium" ranges of concentration was examined using an equation of form (1) and including the estimated concentration ratio data, the results gave an estimated coefficient of 0.01122 for the price-cost margin measure and the "high" range and -0.00894 for the "medium" range. The t-tests for each showed these to be statistically nonsignificant at the 90% confidence level. The sample size for the "low" range of concentration was too small to warrant evalu-

TABLE 10

RESULTS: THE RELATIONSHIP BETWEEN CONCENTRATION AND PRICE-COST MARGINS

A: $Y = a + BX_1$ WHERE Y = CONCENTRATION, X_1 = PRICE-COST MARGINS (1960-71):

CONCENTRATION DATA	INTERCEPT (a)	ESTIMATED COEFFICIENT (B)	STANDARD ERROR OF ESTIMATED COEFFICIENT	t-VALUE	R^2	F-VALUE	STANDARD ERROR OF EQUATION
INCLUDING ESTIMATED CONCENTRATION RATIOS	.10311	.00456	.00159	2.87**	.3401	8.25**	.14206
EXCLUDING ESTIMATED CONCENTRATION RATIOS	.10486	.00423	.00188	2.25*	.2972	5.07*	.1557

CONCENTRATION DATA	RANGE OF CONCENTRATION	INTERCEPT (a)	ESTIMATED COEFFICIENT (B)	STANDARD ERROR OF ESTIMATED COEFFICIENT	t-VALUE	R^2	F-VALUE	STANDARD ERROR OF EQUATION
INCLUDING ESTIMATED CONCENTRATION RATIOS	"HIGH"	-.46451	.01122	.00753	1.49	.3566	2.22	.17522
EXCLUDING ESTIMATED CONCENTRATION RATIOS		-.3379	.0098	.00909	1.08	.2793	1.16	.19654
INCLUDING ESTIMATED CONCENTRATION RATIOS	"MEDIUM"	.65727	-.00894	.00494	-1.81	.2901	3.27	.12313
EXCLUDING ESTIMATED CONCENTRATION RATIOS		.57995	-.00672	.00571	-1.18	.2168	1.38	.12614

ation.

When an equation of form (1) was tested on data which excluded the estimated concentration ratios, the estimated coefficients were 0.0098 and -0.00672 for the price-cost variable within the "high" and "medium" ranges of concentration, respectively. Again, both values were found to be statistically nonsignificant at the 90% level (see Table 10).

The apparent lack of a statistical relationship between "high" concentration and high profit levels is surprising but may possibly be explained due to price inflexibility during periods of changing economic conditions, giving rise to unstable profit levels. Another possible explanation is that the firms may fear intervention by the government if their profit levels appear too high. However, when a chi-square test was performed on the average of the price-cost margins for the industries included in each range of concentration excluding those industries for which estimated concentration ratios had been generated, a significant difference (at the 90% confidence level) was found between the price-cost margins for each range of concentration (see Appendix E). This implies that the average price-cost margin is related to the range of concentration and that differences in price-cost margins were not simply due to random fluctuations.

When the relationship between the 1965 concentration ratios and the 1972 price-cost margins was tested using an equation of form (1) and data which included the estimated concentration ratios, the estimated coefficient on the price-

cost variable was 0.0053. The t-test shows this to be significant at the 99% confidence level. Similarly, when the estimated concentration ratio data were excluded, the estimated coefficient was 0.0057. This was significant at the 99% confidence level (see Table 11)

The above model was also tested within the "high" and "medium" ranges of concentration. When the estimated concentration ratio data were included,the test for the "high" range showed an estimated coefficient of 0.0144. This is significant at the 90% confidence level whereas for the "medium" range, the estimated coefficient was nonsignificant. The results were similar when the estimated concentration ratio data were excluded. The test on the data for the "high" range yielded an estimated coefficient of 0.0115 for the price-cost variable which was non-significant at the 90% level (see Table 11).

Therefore, the conclusion here is that there is a moderate relationship between the level of profits (as measured by the price-cost margin proxy) and the level of concentration. We can, therefore, expect that as concentration increases, so will the level of profits. This relationship existed during a relatively stable economic period as well as during the inflationary period of 1972. The relationship does appear to be stronger during the inflationary year of 1972 as is shown by the higher correlation coefficients (R^2) associated with the test using 1972 price-cost margin data (see Table 11).

TABLE 11

RESULTS: THE RELATIONSHIP BETWEEN CONCENTRATION AND PRICE-COST MARGINS

A: $Y = a + BX_1$, WHERE Y = CONCENTRATION, X_1 = PRICE-COST MARGINS (1972):

CONCENTRATION DATA	INTERCEPT (a)	ESTIMATED COEFFICIENT (B)	STANDARD ERROR OF ESTIMATED COEFFICIENT	t-VALUE	R^2	F-VALUE	STANDARD ERROR OF EQUATION
INCLUDING ESTIMATED CONCENTRATION RATIOS	.04156	.0053	.0017	3.14*	.43	9.85	.13610
EXCLUDING ESTIMATED CONCENTRATION RATIOS	.04631	.0057	.0015	3.70*	.55	13.71	.12104

B: $Y = a + BX_1$, WHERE Y = CONCENTRATION, X_1 = PRICE-COST MARGINS (1972):

CONCENTRATION DATA	RANGE OF CONCENTRATION	INTERCEPT (a)	ESTIMATED COEFFICIENT (B)	STANDARD ERROR OF ESTIMATED COEFFICIENT	t-VALUE	R^2	F-VALUE	STANDARD ERROR OF EQUATION
INCLUDING ESTIMATED CONCENTRATION RATIOS	"HIGH"	-.66219	.0144	.0052	2.78*	.72	7.72	.11980
EXCLUDING ESTIMATED CONCENTRATION RATIOS		-.40052	.0115	.0038	3.01*	.82	9.04	-.08279
INCLUDING ESTIMATED CONCENTRATION RATIOS	"MEDIUM"	.57731	-.0075	.0049	-1.54	.28	2.37	.107117
EXCLUDING ESTIMATED CONCENTRATION RATIOS		.58626	-.0072	.0042	-1.72	.37	2.97	-.09153

The relationship between price-cost margins and concentration does not appear to be stronger for any particular range of concentration during the longer period of relative economic stability. However, the results for the "high" range of concentration data show a highly significant relationship for 1972. This feature suggests that the relationship between concentration and price-cost margins within the "high" range of concentration may be especially strong during inflationary periods.

Concentration, Price Stability and Price-Cost Margins

Since, when tested independently, the price stability variable did not appear to be significantly related to the level of concentration whereas the profit level was apparently significantly related to the level of concentration, one would expect similar relationships when the joint effect of these variables is tested. In a situation where variation in the percentage change in prices is small, one might expect profit levels to be lower at least in the long-run. This tendency is hypothesized since firms whose prices increase at a relatively constant level will likely experience lower profits during periods of higher prices than will firms who adjust their price levels on a more random basis. The strongest relationship between price stability, profit levels and concentration ratios was expected to be within the industries which fall in the "medium" range of concentration ratios. For this range one would expect to observe a moderate degree of price stability and

moderate profit levels.

Examination of the joint relationship of the 1960-71 price stability indices and profit level data (as measured by price-cost margins) to the 1965 concentration ratios for the Canadian food manufacturing industries (where the estimated concentration ratio data were included) showed the estimated coefficient on the price-cost margin variable to be significant at the 90% confidence level whereas the estimated coefficient for the price stability variable was nonsignificant at the 90% level. Both variables were nonsignificant at the 90% level when the model was tested using only the non-estimated concentration ratio data (see Table 12). The correlation coefficients for these equations were also low and the F-test showed these to be nonsignificant at the 90% confidence level.

These results imply that the variability in the 1965 concentration ratios cannot be adequately explained by the degree of price stability and the level of profits for these industries.

When equation (3) was tested to examine the joint relationship of price stability and profit levels to concentration ratios within the "high" and "medium" ranges of concentration (where the data included the estimated concentration ratios), the results as presented in Table 12 show the estimated coefficients for the "high" range to be nonsignificant at the 90% confidence level. The test applied to the "medium" range gave an estimated coefficient of 2.6325 for

TABLE 12

CONCENTRATION, PRICE STABILITY AND PRICE-COST MARGINS (1960-71)

A: $Y = a + B_1X_1 = B_2X_2$ WHERE Y = CONCENTRATION, X_1 = PRICE-COST MARGINS (1960-71) X_2 = PRICE STABILITY (1960-71):

CON. DATA	INTERCEPT (a)	ESTIMATED COEFFICIENT (B_1)	STANDARD ERROR OF ESTIMATED COEFFICIENT	t-VALUE	ESTIMATED COEFFICIENT (B_2)	STANDARD ERROR OF ESTIMATED COEFFICIENT	t-VALUE	R^2	F-VALUE	STANDARD ERROR OF EQUATION
INC. ESTIMATED CON. RATIOS	25.88458	64.47484	30.55486	2.11013*	.86233	.78533	1.09805	.2367	2.33	23.67
EXC. ESTIMATED CON. RATIOS	39.09853	58.29995	40.56812	1.43709	-1.60513	3.28496	-.48863	.3121	2.5	20.7535

B: $Y = a + B_1X_1 = B_2X_2$ WHERE Y = CONCENTRATION, X_1 = PRICE-COST MARGINS (1960-71) X_2 = PRICE STABILITY (1960-71):

CON. DATA	RANGE OF CONCENTRATION	INTERCEPT (a)	ESTIMATED COEFFICIENT (B_1)	STANDARD ERROR OF ESTIMATED COEFFICIENT	t-VALUE	ESTIMATED COEFFICIENT (B_2)	STANDARD ERROR OF ESTIMATED COEFFICIENT	t-VALUE	R^2	F-VALUE	STANDARD ERROR OF EQUATION
INC. ESTIMATED CON. RATIOS	"HIGH"	67.34419	28.00555	27.43367	1.02085	-.14073	.47273	-.29770	.3751	.9	10.61687
EXC. ESTIMATED CON. RATIOS		-127.493	212.315	153.989	1.37877	45.4893	32.39532	1.40419	.6371	1.76	9.21258
INC. ESTIMATED CON. RATIOS	"MEDIUM"	33.74315	-11.7502	18.96609	-.61954	2.6325	1.37802	1.91035*	.5334	4.0*	6.43228
EXC. ESTIMATED CON. RATIOS		33.25708	-20.88102	19.32239	-1.08066	4.05193	1.57376	2.57468*	.7052	4.79*	5.99481

the price stability variable. This is statistically significant at the 90% confidence level. The correlation coefficient for the equation was 0.53 which is significant at the 90% confidence level. The relationship for the "low" range of concentration was not tested due to an insufficient sample size.

Equation (3) was also tested on data which excluded the estimated concentration ratios. The results were generally comparable to those for the previous set of regressions. The estimated coefficients associated with the test for the "high" range were both found to be statistically nonsignificant at the 90% level. The "medium" range test yielded an estimated coefficient of 4.05193 for the price stability variable. This is significant at the 90% confidence level. The estimated coefficient on the price-cost margin variable was found to be nonsignificant at the 90% level. The correlation coefficient for the "medium" range was 0.71; this is significant at the 90% level.

When equation (3) was tested using the 1972-74 price stability indices and the 1972 price-cost margin data in an effort to explain the variability in the 1965 concentration levels (where the data included the estimated concentration ratios), the estimated coefficient for the price-cost margin variable was found to be significant at the 99% confidence level and the price stability coefficient was significant at the 90% level. (see Table 13). When only the non-estimated concentration ratio data were used, the estimated coefficient

on the price-cost margin variable was significant at the 98% level whereas that for the price stability variable was nonsignificant at the 90% level.

Examination of the relationship between the 1972-74 price stability indices, the 1972 price-cost margins and concentration ratios within the "high" and "medium" ranges of concentration (using equation (3) and including the estimated concentration ratio data), yielded an estimated coefficient for the price-cost margin variable which is significant at the 90% level for the "high" range of concentration. The estimated coefficient for the price stability variable was nonsignificant at the 90% level. For the "medium" range of concentration both estimated coefficients were statistically nonsignificant at the 90% confidence level. The model was also tested excluding the estimated concentration ratio data. None of the estimated coefficients for either the "high" or "medium" ranges of concentration proved to be significant at the 90% level.

The results from this section of the study tend, therefore, to confirm the suggestion that a relationship between price-cost margins and concentration did exist and that this relationship was somewhat stronger during the inflationary period of 1972 as evidenced by the higher confidence levels and the higher values of the estimated coefficients associated with the tests for the 1972 period. The relationship between price stability indices and concentration ratios within the "medium" range of concentration

TABLE 13

RESULTS: THE RELATIONSHIP BETWEEN CONCENTRATION, PRICE-STABILITY AND PRICE-COST MARGINS

A: $Y = a + B_1X_1 + B_2X_2$, WHERE Y = CONCENTRATION, X_1 = PRICE-COST MARGINS (1972), X_2 = PRICE STABILITY (1972-74):

CON. DATA	INTERCEPT (a)	ESTIMATED COEFFICIENT (B_1)	STANDARD ERROR OF ESTIMATED COEFFICIENT	t-VALUE	ESTIMATED COEFFICIENT (B_2)	STANDARD ERROR OF ESTIMATED COEFFICIENT	t-VALUE	R^2	F-VALUE	STANDARD ERROR OF EQUATION
INC. ESTIMATED CON. RATIOS	11.18887	104.0449	26.6937	3.90*	.4506	.2418	1.86***	.56	7.60	15.5079
EXC. ESTIMATED CON. RATIOS	27.57581	93.8951	31.4987	2.98**	-.2696	1.0085	-.27	.57	6.57	16.23523

B: $Y = a + B_1X_1 + B_2X_2$, WHERE Y = CONCENTRATION, X_1 = PRICE-COST MARGINS (1972), X_2 = PRICE STABILITY (1972-74):

CON. DATA	RANGE OF CONCENTRATION	INTERCEPT (a)	ESTIMATED COEFFICIENT (B_1)	STANDARD ERROR OF ESTIMATED COEFFICIENT	t-VALUE	ESTIMATED COEFFICIENT (B_2)	STANDARD ERROR OF ESTIMATED COEFFICIENT	t-VALUE	R^2	F-VALUE	STANDARD ERROR OF EQUATION
INC. ESTIMATED CON. RATIOS	"HIGH"	37.0941	78.6733	20.2328	3.89***	.02534	.1353	1.87	.90	8.84	5.22415
EXC. ESTIMATED CON. RATIOS		28.57059	86.1173	13.9734	6.16	.9991	.4054	2.46	.97	19.02	3.46103
INC. ESTIMATED CON. RATIOS	"MEDIUM"	55.17941	-45.4480	31.0373	-1.46	-.1154	.2406	-.48	.31	1.13	8.20594
EXC. ESTIMATED CON. RATIOS		44.88662	-57.3381	28.6291	-2.00	1.2981	.8746	1.48	.58	2.79	7.13303

was significant during the relatively stable economic period from 1960-71, but inconsistent results do not provide confirmation of any relationship during 1972.

Concentration and Tariff Levels

The expected effect of tariff protection is to give domestic producers a competitive advantage over potential imports in the domestic market. This may enable inefficient domestic producers to survive. Depending on the level of tariff protection, tariffs may also allow domestic producers to gain sufficient market share so as to become quite highly concentrated. If this is the case, then policy should be directed towards maintaining tariffs at levels which do not induce a tendency toward highly concentrated firms.

The results of testing an equation of the form of equation (1), which is a simple linear regression model examining the relationship of 1965 concentration ratios and nominal and effective tariff rates (using data on tariff rates for 1961, 1966 and 1970), are presented in Table 14. Inclusion of the 1961 tariff rate data resulted in an estimated coefficient for this variable of 0.06138 for the nominal tariff rates and 0.14848 for the effective tariff rates. These initial tests applied to concentration ratio data which included the estimated concentration ratios. Excluding these estimated concentration ratio data yielded estimated coefficients on the tariff variable of -1.49548 and -0.09391 for the nominal and effective rates, respectively. Application of

TABLE 14

RESULTS: THE RELATIONSHIP BETWEEN CONCENTRATION RATIOS AND TARIFF LEVELS

A: $Y = a + BX_1$ WHERE Y = CONCENTRATION, X_1 = TARIFF LEVELS

CON. DATA	TARIFF DATA	YEAR	INTERCEPT (a)	ESTIMATED COEFFICIENT (B)	STANDARD ERROR OF ESTIMATED COEFFICIENT	t-VALUE	R^2	F-VALUE	STANDARD ERROR OF EQUATION
INC. ESTIMATED CONCENTRATION RATIOS	NOMINAL TARIFF RATES	1961	45.65114	.06138	.90911	.07	.0003	0	17.92951
EXCLUDING ESTIMATED CONCENTRATION RATIOS			60.70975	-1.49548	1.39406	-1.07	.1134	1.15	17.21318
INC. ESTIMATED CONCENTRATION RATIOS		1966	58.98658	-1.66785	.95781	-1.74*	.0178	3.03*	16.25804
EXCLUDING ESTIMATED CONCENTRATION RATIOS			70.75852	-2.79942	1.01458	-2.75***	.4583	7.61***	13.45508
INC. ESTIMATED CONCENTRATION RATIOS		1970	57.37792	-1.87143	.98873	-1.89*	.2038	3.58*	16.00156
EXCLUDING ESTIMATED CONCENTRATION RATIOS			65.13307	-2.94287	1.28077	-2.29**	.3697	5.28**	14.51288
INC. ESTIMATED CONCENTRATION RATIOS	EFFECTIVE TARIFF RATES	1961	38.42584	.14848	.30345	.49	.0168	.24	17.78103
EXCLUDING ESTIMATED CONCENTRATION RATIOS			46.40956	- .09391	.38697	- .24	.0065	.06	18.2210~~3~~7
INC. ESTIMATED CONCENTRATION RATIOS		1966	56.76752	- .61122	.32057	-1.91*	.2061	3.64*	15.97761
EXCLUDING ESTIMATED CONCENTRATION RATIOS			65.74437	-1.09276	.32452	-3.37****	.5575	11.34	12.16038
INC. ESTIMATED CONCENTRATION RATIOS		1970	53.42571	- .61261	.29812	-2.05*	.2317	4.22*	15.71796
EXCLUDING ESTIMATED CONCENTRATION RATIOS			58.16746	-1.00572	.36036	-2.79***	.4639	7.79***	13.38445

t-tests showed these values to be nonsignificant at the 90% confidence level.

The tests which included the 1966 and 1970 tariff data indicated a significant relationship between each of these variables and the level of concentration. This was particularly the case for the effective tariff rates and the nonestimated concentration ratio data. For the 1966 tariff data and including the estimated concentration ratio data, the estimated coefficients on the tariff variables were -1.66785 (significant at the 90% level) and -0.61122 (significant at the 90% level) for the nominal and effective tariff rates, respectively. When the regressions were retested on data which excluded the estimated concentration ratios, the estimated coefficients were -2.79942 (significant at the 98% level) for the nominal tariff rate variable and -1.09276 (significant at the 99% level) for the effective tariff rate variable.

Application of the tests to the 1970 tariff rate data showed a similar pattern. When estimated concentration ratio data were included, the estimated coefficients were -1.87143 (significant at the 95% level) for the nominal tariff rate variable and -0.61261 (significant at the 90% level) for the effective tariff rate variable. Retesting on data which excluded the estimated concentration ratios yielded estimated coefficients of -2.94287 (significant at the 95% level) and -1.00572 (significant at the 99% level) for the nominal and effective tariff rate variables, respectively.

Although the results using the 1961 tariff rate data are not consistent with the results using the 1966 and 1970 tariff rate data, there does appear to be some indication of a negative relationship between the level of tariff protection and the level of concentration. If this relationship applies, then tariff rates would tend to be higher for less concentrated industries. That is, the less concentrated an industry, the greater the level of protection afforded it. Examination of the average levels of tariff protection for the food manufacturing industry as a whole, as shown in Table 15, reveals that the 1961 level of tariff protection was higher than the 1966 or 1970 levels. It is possible that above a certain critical level of tariff rate protection, there is no impact upon concentration. Further study of this point is therefore necessary before any conclusions can be made.

Tariff Levels and Price-Cost Margins

Finding no support for the hypothesis that concentration tends to increase as the level of tariffs increases, it was decided to examine the impact of tariffs on price-cost margins. It would seem probable that as the protection afforded by tariffs increased, so might the level of profits.

The relationship between average price-cost margins over the period from 1960 to 1971 for the Canadian food manufacturing industries and the associated nominal and effective tariff rate levels for the years 1961, 1966 and 1970 was

TABLE 15

MEAN LEVELS OF TARIFF PROTECTION, 1961, 1966 and 1970 (PERCENTAGES)

YEAR	NOMINAL TARIFF RATES INC. ESTIMATED CON. RATIOS	NOMINAL TARIFF RATES EXC. ESTIMATED CON. RATIOS	EFFECTIVE TARIFF RATES INC. ESTIMATED CON. RATIOS	EFFECTIVE TARIFF RATES EXC. ESTIMATED CON. RATIOS
1961	11.47	11.03	26.46	23.32
1966	9.97	9.48	23.58	19.70
1970	8.03	7.11	18.07	13.87

tested, initially using a simple linear regression (of the form of equation (1)). The estimated coefficients on the nominal tariff rate variable were 0.00365, 0.01218, and 0.00869, respectively, for the tariff data for 1961, 1966 and 1970. These were all nonsignificant at the 90% confidence level (see Table 16). When the model was retested using the effective tariff rate data, the estimated coefficient on the 1961 tariff rate variable was -0.00426 (which is significant at the 90% level). The estimated coefficients for the 1966 and 1970 tariff rate variables were -0.00304 and -0.00344, respectively. Both of these values were nonsignificant at the 90% confidence level.

The relationship between average price-cost margins and tariff levels was also tested using a log-linear regression function (of the general form of equation (2)). Using the nominal tariff rate data, the estimated coefficients were 0.11507 (nonsignificant at the 90% confidence level for the 1961 variable, 0.41982 (significant at the 90% confidence level) for the 1966 variable and 0.23101 (nonsignificant at the 90% confidence level) for the 1970 variable (see Table 17). The estimated coefficient on the effective tariff rate variable for 1961 was -0.30122. This was significant at the 90% confidence level. For the 1966 and 1970 tariff rate data, the estimated coefficients were -0.10476 and -0.14189. Both of these values were nonsignificant at the 90% confidence level.

TABLE 16

RESULTS: THE RELATIONSHIP BETWEEN TARIFF LEVELS AND PRICE-COST MARGINS

A: $Y = a + BX_1$ WHERE Y = TARIFF LEVELS, X_1 = PRICE-COST MARGINS (1960-71)

TARIFF DATA	YEAR	INTERCEPT (a)	ESTIMATED COEFFICIENT (B)	STANDARD ERROR OF ESTIMATED COEFFICIENT	t-VALUE	R^2	F-VALUE	STANDARD ERROR OF ESTIMATE
NOMINAL	1961	.22281	.00365	.00726	.50275	.0206	.25	.14139
TARIFF	1966	.14573	.01218	.00777	1.56757	.1699	2.46	.13017
RATES	1970	.19993	.00869	.00923	.94150	.0687	.89	.13766
EFFECTIVE	1961	.37592	-.00426	.00218	-1.95413*	.2404	3.8*	.12452
TARIFF	1966	.33501	-.00304	.00313	- .97125	.0727	.94	.13758
RATES	1970	.32175	-.00344	.00329	-1.04559	.0837	1.1	.13676

TABLE 17

RESULTS: THE RELATIONSHIP BETWEEN TARIFF AND PRICE-COST MARGINS

A: LOG Y = LOG a+B LOG X_1 WHERE Y = TARIFF LEVELS, X_1 = PRICE-COST MARGINS (1960-71)

TARIFF DATA	YEAR	INTERCEPT (a)	ESTIMATED COEFFICIENT (B)	STANDARD ERROR OF ESTIMATED COEFFICIENT	t-VALUE	R^2	F-VALUE	STANDARD ERROR OF ESTIMATE
NOMINAL	1961	-.7519	.11507	.2506	.45918	.0173	.21	.25537
TARIFF	1966	-1.0248	.41982	.21972	1.91070*	.2333	3.65*	.22557
RATES	1970	- .81825	.23101	.20221	1.14243	.0981	1.31	.24465
EFFECTIVE	1961	- .24008	-.30122	.14942	-2.01593*	.2503	4.06*	.22265
TARIFF	1966	- .50225	-.10476	.24047	- .43565	.0156	.19	.2556
RATES	1970	- .49054	-.14189	.12274	-1.15602	.1002	1.34	.24436

The results of this section, therefore, indicate that variability in the average level of profits over the period from 1960-71 (as measured by the price-cost margin proxy) in the Canadian food manufacturing industries cannot be adequately explained by either the nominal or effective tariff rates associated with these industries in 1961, 1966 or 1970.

An equation of the general form of equation (1) was also tested in an attempt to determine any impact on price-cost margins during the inflationary period of 1972. The relationship between the 1972 price-cost margin variable and the 1970 nominal and effective tariffs was examined. The estimated coefficient on the nominal tariff rate variable was 0.0003 which was nonsignificant at the 90% confidence level. The test including the effective tariff rate variable yielded an estimated coefficient of 0.0063 for this variable, which was significant at the 90% confidence level (see Table 18).

When the above relationship was tested using an equation of the general form of equation (2) similar results emerged. The estimated coefficient associated with the nominal tariff rate variable was 0.1643. This was nonsignificant at the 90% confidence level. The estimated coefficient associated with the effective tariff rate variable was 0.2268. This value was significant at the 90% confidence level (see Table 18).

TABLE 18

RESULTS: THE RELATIONSHIP BETWEEN TARIFF LEVELS AND PRICE-COST MARGINS

A: $Y = a+B_1$ WHERE Y = TARIFF LEVELS, X_1 = PRICE COST MARGINS (1972)

TARIFF DATA	INTERCEPT (a)	ESTIMATED COEFFICIENT (B)	STANDARD ERROR OF ESTIMATED COEFFICIENT	t-VALUE	R^2	F-VALUE	STANDARD ERROR OF ESTIMATE
NOMINAL TARIFF RATES	.24423	.0003	.0101	.03	0	0	.11647
EFFECTIVE TARIFF RATES	.35286	-.0063	.0025	-2.48**	.38	6.16	.09161

B: LOG Y = LOG a+B LOG X_1 WHERE Y = TARIFF LEVELS, X_1 = PRICE-COST MARGINS (1972)

TARIFF DATA	INTERCEPT (a)	ESTIMATED COEFFICIENT (B)	STANDARD ERROR OF ESTIMATED COEFFICIENT	t-VALUE	R^2	F-VALUE	STANDARD ERROR OF ESTIMATE
NOMINAL TARIFF RATES	.044025	.1643	.2855	.58	.03	.33	.23125
EFFECTIVE TARIFF RATES	.199613	-.2268	.1154	-1.97*	.28	3.87	.19961

It appears, therefore, that effective tariff rates had a negative impact upon price-cost margins during 1972. It is possible that during periods of rising prices, consumers may be more likely to ignore the cost imposed by tariffs on imports. This could likely have an adverse effect upon domestic profit levels.

Concentration, Price Stability, Tariff Rates and Price-Cost Margins

The lack of evidence of any significant relationship between tariff levels and price-cost margins in the food manufacturing industry prompted a series of tests using multiple regression analysis in an attempt to determine whether the combined impact of the extent of concentration, price stability and tariff rate levels had any relationship to the level of average profits as measured by price-cost margins .

The initial linear multiple regression, equation (4), was tested on data which included and excluded the estimated concentration ratios. The test utilized both the nominal and effective tariff rate data for 1961, 1966 and 1970. The results are presented in Table 19. The only significant correlation coefficient (R^2) was yielded by that regression which tested the relationship between the non-estimated concentration ratios, price stability, the 1961 effective tariff rates and the price-cost margin data. This correlation coefficient was 0.59 which was significant at the 90% confi-

TABLE 19

RESULTS: THE RELATIONSHIP BETWEEN CONCENTRATION, PRICE STABILITY, TARIFF LEVELS AND PRICE-COST MARGINS

A: $Y = a+B_1X_1+B_2X_2+B_3X_3$ WHERE Y = PRICE-COST MARGINS, X_1 = CONCENTRATION X_2 = PRICE STABILITY, X_3 = TARIFF LEVELS

CON. DATA	TAR. DATA	YEAR	INTERCEPT (a)	EST. COEF. (B_1)	STANDARD ERROR OF ESTIMATED COEFFICIENT	t-VALUE	EST. COEF. (B_2)	STANDARD ERROR OF ESTIMATED COEFFICIENT	t-VALUE	EST. COEF. (B_3)	STANDARD ERROR OF ESTIMATED COEFFICIENT	t-VALUE	R^2	F-VALUE	STANDARD ERROR OF ESTIMATE
INC. EST. CON. RATIOS	NOM. TAR. RATES	1961	.22784	-.00015	.00269	-.00576	-.00508	.0067	-.75821	.00622	.00848	.73349	.0897	.33	.14833
EXC. EST. CON. RATIOS			.74784	-.00266	.0023	-1.15632	-.04049	.01743	-2.32301*	-.01885	.01051	-1.79353	.4799	2.15	.11382
INC. EST. CON. RATIOS		1966	.03406	.00221	.00958	.23069	-.00736	.00588	-1.25170	.01766	.00958	1.84342*	.2841	1.32	.13243
EXC. EST. CON. RATIOS			.38632	-.00068	.00373	-.18231	-.02808	.02154	-1.30362	.00176	.01547	.11377	.2423	.75	.13738
INC. EST. CON. RATIOS		1970	.15594	.00108	.00298	.36242	-.00583	.00647	-.90108	.01246	.00159	7.83648***	.1400	.54	.14514
EXC. EST. CON. RATIOS			.51125	-.00187	.00315	-.59365	-.02954	.01934	-1.52740	-.00698	.01508	-.46286	.2635	.83	.13545
INC. EST. CON. RATIOS	EFF. TAR. RATES	1961	.43239	-.00114	.00237	-.48101	.00377	.00665	.56692	-.00512	.00289	-1.77163	.2697	1.23	.13375
EXC. EST. CON. RATIOS			.49829	-.00106	.00187	-.56684	-.01422	.01561	-.91095	-.00572	.00233	-2.45494**	.5913	3.38*	.10089
INC. EST. CON. RATIOS		1966	.61107	-.00459	.00375	-1.22400	.00558	.00832	.67067	-.00751	.00531	-1.41431	.2003	.83	.13996
EXC. EST. CON. RATIOS			.72557	-.00493	.0032	-1.54063	-.02213	.0171	-1.29415	-.00803	.00481	-1.66944	.4568	1.96	.11632
INC. EST. CON. RATIOS		1970	.5793	-.00473	.00365	-1.29589	.00599	.00815	.73497	-.00831	.00546	-1.52198	.2211	.95	.13813
EXC. EST. CON. RATIOS			.65422	-.00496	.0028	-1.77143	-.01049	.01798	-.58343	-.00949	.00464	-2.04526	.5250	2.58	.18878

TABLE 20

RESULTS: THE RELATIONSHIP BETWEEN CONCENTRATION, PRICE STABILITY, TARIFF LEVELS AND PRICE-COST MARGINS

A: $\text{LOG } Y = \text{LOG } a+B_1\text{LOG } X_1 + B_2\text{LOG } X_2+B_3\text{LOG } X_3$ WHERE Y = PRICE-COST MARGINS, B_1 = CONCENTRATION, B_2 = PRICE STABILITY, B_3 = TARIFF LEVELS

		YEAR	INTERCEPT (a)	EST. COEF. (B_1)	STANDARD ERROR OF ESTIMATED COEFFICIENT	t-VALUE	EST. COEF. (B_2)	STANDARD ERROR OF ESTIMATED COEFFICIENT	t-VALUE	EST. COEF. (B_3)	STANDARD ERROR OF ESTIMATED COEFFICIENT	t-VALUE	R^2	F-VALUE	STANDARD ERROR OF ESTIMATE
INC. CON. EST. RATIOS	NOM TAR RATES	1961	- .95251	.18633	.52495	.35495	-.15321	.18486	- .82879	.09474	.26812	.35335	.0804	.29	.27061
EXC. CON. EST. RATIOS			.88382	-.24386	.35875	-.67975	-.95457	.27761	-3.43853	-.6086	.25526	-2.38424**	.6504	4.34**	.17171
INC. CON. EST. RATIOS		1966	-2.3563	.78454	.48139	1.62974	-.21351	.14722	-1.45028	.60476	.2432	2.48668**	.4247	2.46	.21404
EXC. CON. EST. RATIOS			-1.48296	.48368	.67184	.71993	-.50557	.37185	-1.35961	.36779	.40951	.89812	.4320	1.77	.21888
INC. CON. EST. RATIOS		1970	-1.71149	.56349	.55193	1.02094	-.19815	.17098	-1.15891	.33725	.23619	1.42788	.2266	.98	.24817
EXC. CON. EST. RATIOS			- .30137	.0202	.6266	.03224	-.67539	.35288	-1.91394*	-.00236	.31666	-.00745	.3665	1.35	.23114
INC. CON. EST. RATIOS	EFF TAR RATES	1961	- .33006	.08512	.46155	.18442	-.12358	.16231	- .76138	-.28789	.16047	-1.79404	.2957	1.4	.23683
EXC. CON. EST. RATIOS			.42843	-.15176	.26926	-.56362	-.67105	.19573	-3.42845****	-.36626	.09805	-3.73544***	.7884	8.69****	.13359
INC. CON. EST. RATIOS		1966	- .64349	.09693	.71304	.13594	-.14445	.20559	- .70261	-.05731	.34731	-.16501	.0715	.26	.27192
EXC. CON. EST. RATIOS			1.66792	-.76923	.74337	-1.03479	-.80751	.32188	-2.50873**	-.51367	.40063	-1.28216	.4870	2.22	.20801
INC. CON. EST. RATIOS		1970	- .25659	-.1009	.5699	-.17705	-.11301	.18186	- .62141	-.15157	.14783	-1.02530	.1575	.62	.25902
EXC. CON. EST. RATIOS			.88978	-.5364	.40479	-1.32513	-.74923	.2494	-3.00413****	-.27208	.11018	-2.46941	.6615	4.56**	.16898

dence level. The various t-tests showed that the only estimated coefficient in the equation that was significant was that for the 1961 effective tariff rate variable. This estimated coefficient was -0.00572 and was significant at the 95% confidence level.

A log-linear form of relationship (equation (5)) was also tested on the above variables. Examination of the results in Table 20 show that three of these regressions yielded correlation coefficients which were significant at or above the 90% confidence level. The first of these tested the relationship between the concentration ratios (using non-estimated data), price stability, 1961 nominal tariff rates and price-cost margin variables. The correlation coefficient was 0.65. This was significant at the 95% confidence level. The t-tests show the estimated coefficient on the 1961 tariff rate variable to be the only estimated coefficient that was significant. This coefficient was -0.6086 and was significant at the 95% confidence level.

A second regression tested the relationship between the concentration ratio (using non-estimated data), price stability, 1961 effective tariff rate and price-cost margin variables. It was found that these three explanatory variables explained 79% of the variation in the average price-cost margin data. This correlation coefficient was significant at the 99% confidence level. The 1961 effective tariff

rate variable had an estimated coefficient of -0.36626. This was significant at the 99% level. The price stability variables had an estimated coefficient of -0.67105 which was significant at the 98% confidence level.

The third regression which yielded a significant correlation coefficient tested the relationship between the non-estimated concentration ratio, price stability, 1970 effective tariff rate and price-cost margin variables. The correlation coefficient was 0.66, which was significant at the 95% confidence level. The estimated coefficient associated with the concentration variable was -0.5364, which was non-significant at the 90% level. The coefficient on the price stability variable was -0.74923, which was significant at the 95% level. Finally, the estimated coefficient on the 1970 effective tariff rate variable was -0.27208, which was significant at the 95% level.

Although no general conclusions can be drawn regarding the relationship between concentration, price stability, tariff rates and the level of profits in the Canadian food manufacturing industries, a few implications may be noted.

First, when the estimated concentration ratio data were excluded from the analysis, the utilization of the effective tariff rate variables gave noticeably higher correlation coefficients. Although these correlation coefficients were not all significant at the 90% level, it is possible that a larger sample might reveal a stronger relationship

between concentration, price stability, effective tariff rates and the level of profits.[1]

Secondly, utilizing the 1961 effective tariff rates and excluding the estimated concentration ratios from the analysis gave relatively high correlation coefficients for both the linear (equation (4)) and the log-linear (equation (5)) regression models. This feature suggests that it is possible that above a certain critical level of tariff rates, there will be a large impact of tariffs upon profits.[2] This possibility is also supported by observing the results of the regressions that tested the relationship between tariff levels and price-cost margins (see Tables 16 and 17). The equation which included the effective tariff rate variable for 1961 showed a significant correlation coefficient for both the linear and the log-linear formulations.

Thirdly, the estimated coefficients associated with the price stability variable were all negative. This feature is consistent with the hypothesis presented earlier that firms experiencing greater price instability will tend to have higher profit levels.

Further study will be necessary to determine more precisely the nature of any relationship between concentration, price stability, tariff levels and the level of profits.

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1. That is, the lack of a stronger relationship may be due to too few degrees of freedom.

2. Again, observe in Table 15 that the 1961 tariff rates were, on the average, higher than the 1966 and 1970 levels.

General Conclusions

The preceding results tend to give some indication that therelationship between concentration and the level of price stability is greatest for those industries classified as being within the "medium" range of concentration. Examination of a simple linear regression model which compared the level of price stability over the period from 1960 to 1971 and the 1965 level of concentration in the food manufacturing industries of Canada, resulted in correlation coefficients which were nonsignificant at the 90% confidence level. When the above relationship was tested within the "high", "medium" and "low" ranges of concentration, the results for the test within the "medium" concentration range was the only one to yield significant coefficients for the price stability variable. When the estimated concentration ratio data were included, the resulting correlation coefficient was 0.5078 which is significant at the 98% confidence level. When the estimated concentration ratio data were excluded, the correlation coefficient was 0.6192. This was significant at the 95% level.

Examination of price stability indices for 1972 to 1974 and of 1965 concentration ratios gave no evidence of a relationship between these variables. This suggests that the level of concentration does not explain the variability in average price stability during periods of inflation.

The second set of relationships examined in this study were those between industry concentration ratios and the

average level of profits from 1960 to 1971. A simple linear regression model resulted in estimated coefficients of 0.00456 (significant at 95% confidence level) and 0.00423 (significant at 98% confidence level) respectively for runs which included and excluded estimated concentration ratio data. The relationship did not appear to be stronger within any particular range of concentration.

A significant relationship between the above variables was apparent during the inflationary period of 1972. Examination of 1972 price-cost margins and 1965 concentration data gave correlation coefficients of 0.43 and 0.55, respectively, from regressions which included and excluded the estimated concentration ratio data. In both cases the estimated coefficients were significant at the 99% level. The relationship appeared to be particularly strong for those industries which were in the "medium" range of concentration ratios.

Examination of the relationship between concentration, price stability and profit level variables yielded results which tended to confirm the existence of a relationship, but suggested price stability to be the major explanatory variable in explaining variability in concentration ratios. The relationship was found to be stronger during the 1972 to 1974 period than during the period from 1960-71, as evidenced by the higher correlation coefficients and more highly significant estimated coefficients observed during the more recent period.

The fourth factor examined was the effect of tariff

rates upon the level of concentration. Table 14 shows the results of the tests of this relationship. The relationship between the level of concentration and the 1966 and 1970 tariff rate variables was statistically significant at the 90% confidence level, but this did not hold true for the 1961 tariff level variable. One cannot, therefore, come to any definite conclusions about the impact of tariff rates upon concentration.

The relation between tariff levels and price-cost margins was also examined. Since the tests suggest a positive relation of price-cost margins and the level of concentration (see Tables 10 and 11), it is possible that tariff rates have an indirect effect on the level of concentration by affecting the price-cost margins. However, the relationship between the tariff level and price-cost margin variables did not prove significant for either linear or log-linear regression models.

The final relationship tested was that between concentration, price-stability, tariff levels and the level of profits. If one could determine those variables which most affected profit levels, this would be most useful in terms of formulating anti-trust policy. Those variables found to be significant could be operated on by policy decisions in an attempt to restrict the level of profits where these were considered to be excessive and thus indicative of poor market performance.

The results from testing linear and log-linear

regression equations are presented in Tables 19 and 20, respectively. The effective tariff rate variables and the price stability indices proved to be the most significant in explaining variation in price-cost margins. However, inconsistency in the results does not enable any general conclusions to be made regarding the relationships between concentration, price stability, tariff levels, and the level of profits.

Chapter 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

In evaluating the efficiency of an industry in terms of the extent to which it fulfills society's expectations, a concept of workable competition is implied. Combines legislation should be developed with the objective of enforcing this concept of workable competition. In Canada, the aim of combines legislation has been primarily to restrict those trade practices and pricing policies which "unduly" restrict competition. Either Canadian combines legislation is very inadequate as indicated by the lack of convictions associated with it, or else Canadian industry is highly efficient in terms of society's expectations. The latter does not appear to be the case.

In this study, the relationship between price stability, tariff rates, profit rates and concentration levels are examined for the Canadian food manufacturing industries, since information on these relationships from this and other studies may be of use in developing performance criteria and in judging whether an industry is workably competitive or not. Four main hypotheses were examined. The first hypothesis was that the relationship between concentration and the level of price stability is greatest within the "medium" range of concentration. The second hypothesis was that the level of profits is a function of the level of concentration. The third hypothesis tested the relationship between

concentration, the degree of price stability and the level of profits. These hypotheses imply that in industries of "medium" concentration prices will tend to be stable relative to conditions of "low" or "high" concentration, and profits will be moderate relative to conditions of "high" concentration. The assumption implied by these hypotheses is that price stability and moderate profit rates are desirable objectives of workable competition. In turn, these hypotheses imply a wider hypothesis that firms in industries of "medium" concentration can be expected to be more workably competitive than are their counterparts in industries of "low" or "high" concentration. This wider hypothesis is not explicitly tested in this study. The reasoning which underlies it is that industries which are highly concentrated are generally so because of high barriers to entry. These high barriers to entry may allow firms in the industry to adjust prices frequently so as to generate excess profits without the fear of entry of rivals. On the other hand, industries which exhibit "low" concentration generally tend to have low barriers to entry. This may result in a dynamically unstable market structure which experiences price and profit instability. Industries of "medium" concentration are likely to have barriers to entry which are sufficiently high as to allow firms in the industry to achieve long run efficiency in scale and capacity, but low enough to encourage new entrants if prices become too high.

The fourth hypothesis examined in this study was that the degree of tariff protection afforded food manufacturing

industries has promoted concentration by restricting the impact of imports on domestic production. By affecting industry concentration levels, tariffs might also affect associated industry price and profit levels. It was hoped that by also examining the relationship between tariffs and profits, some guidance would result as to the manner in which tariff levels might be used to promote moderate industry profit levels and therefore maintain workable competition within an industry.

Methodology

The relationships between price stability, profit levels, tariff rates and concentration levels for the Canadian food manufacturing industries were tested using regression analysis techniques. Concentration data for the Canadian food manufacturing industry for 1965 were available from a Department of Consumer and Corporate Affairs study.[1] These data were used in this study. The year 1965 was assumed to be representative of the period from 1960 to 1974. Estimates of concentration ratios were generated for those industries for which these data were unavailable.

Price stability indices were generated for each of the Canadian food manufacturing industries. By using time series data of selling price indices, price stability indices were generated for the period of relative economic stability

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1. Department of Consumer and Corporate Affairs, Concentration in the Manufacturing Industries of Canada (Ottawa: 1971).

from 1960 to 1971, and for the inflationary period from 1972 to 1974. The standard deviations of the annual percentage change in the selling price indices for the respective periods were used as the measure of price stability.

Price-cost margin measures were calculated for each industry for each year from 1960 to 1972. The price-cost margin measures served as a proxy for profit levels and were calculated as: $\frac{\text{value added-wages}}{\text{value of shipments}}$, where value added equals the residual after subtracting fixed costs from the value of shipments. The annual industry price-cost margin measures were then used to calculate an industry average for the period from 1960 to 1971 for each industry. Price-cost data for 1972 were the most recent available and were therefore used to calculate price-cost margins representative of the inflationary period from 1972 to 1974.

Data on nominal and effective tariffs for the years 1961, 1966 and 1970 were those calculated by Wilkinson and Norrie.[1]

Results

Examination of the relationship between industry price stability indices and industry concentration ratios over all industries gave no evidence of a statistically significant

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[1] Bruce W. Wilkinson and Ken Norrie, (Economic Council of Canada), Effective Protection and the Return to Capital (Ottawa: Information Canada, 1975).

relationship.[1] However, when the industries were segregated into "high","medium" and "low" ranges of concentration, evidence was found of a statistically significant (linear) relationship between the price stability variable and the 1965 concentration ratio data within the "medium" range of concentration. (It is assumed that the "medium" range of concentration accounts for those induestries having a 4-firm concentration ratio between 30 percent and 65 percent.) The results from this section of the study are consistent with the first hypothesis that the relationship between concentration and the level of price stability is greatest within the "medium" range of concentration. These results indicate that the level of concentration does explain a considerable portion (51-62 percent) of the variability in average price-stability for industries of "medium" concentration during the period of relative economic stability from 1960 to 1971. However, the relationship between price stability indices and industry concentration ratio data within the "medium" range of concentration did not prove to be statistically significant for the inflationary period of 1972. This feature may be due to the upward pressure on all prices during an inflationary period. The method of pricing inventories for accounting purposes also have had an impact on prices during this inflationary period.

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1. The term "statistically significant" is used throughout this chapter to indicate those models which generated estimated coefficients which were significantly different from zero at the 90 percent or greater confidence level.

An examination of the relationship between the concentration ratio data and the average price-cost margin measures yielded estimated coefficients on the price-cost margin variable which were statistically significant. This variable explained 30 to 34 percent of the variation in the concentration ratio variable. These results imply that industry profit levels (as measured by the average price-cost margin measures) are dependent upon and affected by the level of concentration. This feature is consistent with the second hypothesis which is that the level of profits is a function of the level of concentration. However, a further examination of the relationship between the concentration ratio data and the price-cost margin measures within the industry groups showing "high" and "medium" ranges of concentration yielded no statistically significant results. Although a significant relationship between industries of "high" concentration and industries with high profit levels was expected, there may be a number of possible reasons to explain the observed result. First, inflexibility of prices in industries of "high" concentration may give rise to unstable profit levels. Secondly, fear of government intervention might induce firms in an industry to alter their behavior so as to reduce what otherwise might appear as excess profits.

When the relationship between the 1965 industry concentration ratio data and the 1972 industry price-cost margin measures was tested, highly significant results were obtained. This feature is consistent with the second hypothesis

that the level of profits is a function of the level of concentration. The implication of the results is that as the level of industry concentration in the Canadian food manufacturing industry increases, so will the level of industry profits.

Since the price stability variable did not appear to be significantly related to the level of concentration whereas the level of profits was apparently significantly related to the level of concentration when these variables were considered individually, it was expected that similar relationships would result when the joint effect of these two independent variables was tested over all the food manufacturing industries. This proved to be the case (see Tables 12 and 13). The results imply that the variability in the 1965 concentration ratio data for the whole group of Canadian food manufacturing industries cannot be satisfactorily explained by the degree of price stability and the level of profits (as measured by average price-cost margin measures) within the industry. When a regression was tested including and excluding the estimated concentration ratios, the correlation coefficients were 0.24 and 0.31, respectively, both of which are non-significant at the 90 percent confidence level. The results from this section of the study did,however, tend to confirm that a significant relationship exists between the 1965 industry concentration ratio data and the industry price-cost margin measures for the Canadian food manufacturing industry.

Evidence of this relationship was found for the stable economic period from 1960 to 1971, and was also found to be especially strong during the inflationary period of 1972. A significant relationship between the 1960 - 1971 price-stability indices and the industry concentration ratio data within the "medium" range of concentration was also confirmed.

The effect of tariff protection may be to keep the price of domestic imports high. In doing so, tariffs may reduce the impact of foreign competition and, therefore, allow domestic industries, which may be inefficient, to survive. At the same time, tariff protection may allow firms in an industry to gain sufficient market share so that the industry becomes quite highly concentrated.

In examining a simple linear relationship between 1965 concentration ratios (for the Canadian food manufacturing industry) and the nominal and effective tariff rates for the years 1961, 1966 and 1970, a statistically significant negative relation was apparent for the years 1966 and 1970. The lower the industry concentration ratio, the higher the level of tariff protection tended to be, at least for the years 1966 and 1970. These results do not support the hypothesis that the degree of tariff protection afforded food manufacturing industries has promoted increased levels of concentration by restricting the impact of imports on domestic production. The results may be explained by the possibility that above a certain critical level of tariff protection, there is little

impact of nominal or effective tariffs on the level of concentration. This possibility could explain why no evidence of a significant relationship was found between the 1961 tariff rates, which were generally higher than the 1966 and 1970 tariff rates, and the 1965 concentration ratios.

Examination of the relationships between the average industry price-cost margin measures for 1960-71 and the nominal and effective tariff rates for 1961, 1966 and 1970, for the Canadian food manufacturing industry, gave results which were generally nonsignificant. When the relationship between the 1972 price-cost margin measures and the nominal and effective tariff rates were tested, only the coefficient associated with the effective tariff rates was found to be statistically significant. This gave evidence of a negative relation between the effective level of tariff protection and the level of profits (as measured by average price-cost margin measures) for the food manufacturing industries during the inflationary period of 1972. A possible explanation for this feature is that inflation may have caused the price of domestically produced goods to have increased more rapidly than the price of imported goods, thus causing imported goods to be relatively cheaper during that period.

The relationship between the 1965 concentration ratio data, industry price stability indices, industry tariff rates and average price-cost margin measures was examined using a multiple regression function. The results (presented in

Tables 19 and 20) suggest some general conclusions. First, when effective tariff rates were included in the models rather than nominal tariff rates, the correlation coefficients for the equations were noticeably higher. This feature implies that effective tariff rates have a greater influence on the level of profits (as measured by average price-cost margin measures) than the nominal tariff rates. However, this was not suggested by the results (presented in Table 17) from the two variable regression model tested earlier in the study. Secondly, the results tend to support the previous suggestion that above a certain critical level of tariff rates, there may be no impact of tariffs on the level of profits. Thirdly, industries which experienced greater price stability tended to have higher profit levels. This feature is implied by the negative coefficients which were associated with the price stability indices.

Conclusions

The results from this study suggest a number of conclusions. The first conclusion is that the 1965 levels of concentration in the Canadian food manufacturing industries partially explain the variability in average price stability for industries of "medium" concentration during the period of relative economic stability (1960-71). This implies that the relationship between concentration and price stability is greatest with the "medium" range of

concentration. This relationship did not appear to hold during 1972. This result may be due to the upward pressure on all prices during that inflationary period.

The second conclusion emerging from this study is that the level of industry profits (as measured by the price-cost margin measures) in the Canadian food manufacturing industry is dependent on and affected by the level of industry concentration. This relationship was not found to be significantly stronger within any particular range of concentration. The average profit levels in the food manufacturing industry, for the period from 1960 to 1972 appear to be positively related to the 1965 levels of concentration. We can, therefore, expect that as the level of industry concentration increases, so will the level of profits.

The results of the third section of the analysis lead to the conclusion that the variability in the 1965 food manufacturing industry concentration ratio data cannot be adequately explained by the joint impact of the price-stability indices and the industry price-cost margin measures (as a proxy for profits) over the period from 1960 to 1974. However, the results did confirm the suggestion that a relationship between concentration and price-cost margins does exist. Also, the relationship between price stability indices and concentration ratios within the "medium" range of concentration was significant during the relatively stable economic period from 1960 to 1971. On the basis of these results, we cannot

necessarily expect that both greater price stability and higher profit levels will exist at higher levels of industry concentration.

A further conclusion that arises from this study is that variability in the 1965 levels of industry concentration cannot be explained by the 1961, 1966 or 1970 nominal or effective tariffs for the food manufacturing industries. The study also failed to find evidence of any highly significant relationship between the industry price-cost margin measures and the 1961, 1966 or 1970 tariff rate data. However, the results did suggest the possibility that above a certain critical level of tariff protection there may be no impact of tariff rates on the level of profits.

The models tested in this study also found evidence of a significant negative relationship between the industry price stability indices and the average price-cost margin measures for the Canadian food manufacturing industry. From this result, we may deduce that profit levels tend to increase as price stability increases.

Recommendations

The ineffectiveness of existing combines legislation in Canada is largely due to a lack of precision in defining its objectives. This study recommends that future combines legislation in Canada be based on a formulation of workable competition which includes the attributes of stable prices and

moderate profit rates among its norms. To repeat from Chapter 3: "...Canadian competition policy should aim primarily at bringing about more efficient performance by the economy as a whole."[1] The emphasis underlying combines legislation should be whether an industry fulfills the requirements specified by an adequate concept of competition.

The nature of the relationships between industry structure, price stability and price-cost margins within the Canadian food manufacturing industry have been examined within this study. Industries of "high" concentration tend to have greater price instability and higher profit rates than industries of "medium" concentration. Industries of "high" concentration are, therefore, likely to be less workably competitive and hence, a more probable area for investigation as to whether their conduct and subsequent performance is satisfactory. It has also been shown that firms in industries of "low" concentration may not necessarily be as desirable, in terms of our concept of workable competition, as firms in industries of "medium" concentration. On the basis of this study it is recommended that public policy should be designed so as to encourage industries of "medium" concentration which are more likely to be consistent with the concept of workable competition, and that public policy should not be designed so as to encourage the structural feature of "low" or "high" industry concentration levels.

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1. Economic Council of Canada, Interim Report on Competition Policy (Ottawa: 1969).

The relationships between tariff rates, industry concentration ratio data and average price-cost margin measures were also examined. Due to the generally inconclusive nature of the results from this section of the study, it is recommended that further examination of the relationships between tariff rates, concentration ratios, profit levels and levels of efficiency be undertaken before implementing any changes in the Canadian tariff structure.

The lack of timeliness with respect to Canadian concentration data tends to limit the usefulness of studies making use of concentration data. Therefore, it is recommended that the concentration data for Canadian industries be routinely updated at regular intervals (by Statistics Canada) in order to improve the current relevance of any studies using this data.

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APPENDIX A

WHOLESALE PRICE INDEX 1959-74
(1935-39 = 100)

		% change
1959	230.6	
1960	230.9	.13
1961	233.3	1.04
1962	240.0	2.87
1963	244.6	1.92
1964	245.4	.32
1965	250.4	2.04
1966	259.5	3.63
1967	264.1	1.77
1968	269.9	2.20
1969	282.4	4.63
1970	286.4	1.42
1971	289.9	1.22
1972	310.3	7.04
1973	376.9	21.46
1974	460.4	22.15

SOURCE: Statistics Canada, Prices and Price Indexes, Catalogue No. 62-002, 1961-75.

APPENDIX B

PERCENTAGE CHANGES IN THE AVERAGE ANNUAL SELLING PRICE INDEXES OF THE CANADIAN FOOD MANUFACTURING INDUSTRY, 1960-74

S.I.C. NO.	INDUSTRY	1960-1961	1961-1962	1962-1963	1963-1964	1964-1965	1965-1966	1966-1967	1967-1968	1968-1969	1969-1970	1970-1971	1971-1972	1972-1973	1973-1974
1010	SLAUGHTERING & MEAT PROCESSORS	4.8	5.2	-3.3	-3.7	8.7	12.0	-3.4	.1	12.2	-.2	-3.3	15.6	29.5	2.6
1030	POULTRY PROC.	7.1	1.5	17.2	-16.2	1.1	16.2	-6.3	3.1	-2.7	-3.0	4.9	17.8	34.9	7.9
1060	DAIRY FAC. & PROCESS CHEESE MANUF.	.3	-2.4	1.9	1.5	3.0	2.8	2.1	NA	NA	NA	NA	NA	NA	NA
1110	FISH PRODUCTS	6.0	3.0	2.6	4.5	5.2	4.6	2.0	1.0	9.3	12.3	6.2	15.0	31.0	15.1
1120	FRUIT & VEG. CANNERS & PRESERVERS	.8	.5	4.3	4.4	-.7	2.7	2.3	2.1	2.7	2.7	3.2	5.1	8.7	21.5
1230	FEED MANUF.	1.1	8.5	1.1	-2.4	.7	3.1	1.6	-3.1	-3.4	2.1	1.7	2.5	54.1	14.8
1240	FLOUR MILLS	3.8	16.7	-.8	3.6	-1.1	1.2	4.0	-3.1	.7	1.0	3.0	2.6	35.8	28.2
1250	BREAKFAST CEREAL MANUF.	2.0	5.4	1.6	2.3	3.4	1.9	4.7	2.6	5.2	2.8	2.2	2.3	5.9	18.9
1280	BISCUIT MANUF.	.6	-1.6	7.1	5.4	-1.0	1.0	3.9	2.2	4.3	2.4	2.5	4.2	10.3	32.0
1290	BAKERIES	.8	1.4	7.9	4.2	1.8	2.0	.8	3.5	2.9	3.9	3.0	2.6	9.7	23.8
1310	CONFECTIONARY MANUF.	.4	2.0	7.3	4.6	-3.2	-1.0	3.8	4.7	5.1	5.7	.2	2.0	10.5	40.5
1330	SUGAR REFINERIES	-.5	2.3	83.5	-19.0	-36.4	-5.4	4.0	.2	22.5	8.4	8.9	25.3	10.9	168.9
1350	VEG. OIL MILLS	15.7	2.6	.5	-1.4	3.4	9.1	-9.5	-2.8	-.9	9.8	.1	8.0	113.2	-1.0
1391	MACARONI MANUF.	4.3	6.4	7.0	1.4	-.2	2.2	4.5	1.4	1.0	5.0	.3	2.4	20.1	29.2
1392	MISC.FOOD MAN.	1.9	1.8	1.1	7.0	1.4	.4	-2.1	-1.6	3.1	7.2	3.2	1.0	9.6	28.9

APPENDIX B (continued)

S.I.C. NO.	INDUSTRY	1960-1961	1961-1962	1962-1963	1963-1964	1964-1965	1965-1966	1966-1967	1967-1968	1968-1969	1969-1970	1970-1971	1971-1972	1972-1973	1973-1974
1410	SOFT DRINK MANUF.	.5	.5	10.0	11.3	-4.0	0	2.6	3.9	5.8	2.8	9.3	9.6	5.6	25.2
1430	DISTILLERIES	0	.9	.2	4.6	.7	.1	.1	3.3	.1	-.5	-.5	3.5	3.2	4.6
1450	BREWERIES	0	0	.4	2.0	0	.2	2.6	4.2	1.8	.3	2.8	6.9	4.3	27.8
1470	WINERIES	-.2	0	-.2	-1.1	-1.7	-.4	3.8	4.4	.3	.1	1.4	8.1	4.9	5.4

NA - Not available due to change in S.I.C. definition.

SOURCE: Statistics Canada, Prices and Price Indexes, Catalogue No. 62-002, 1961-75.

APPENDIX C

ANNUAL PRICE-COST MARGINS,[1] 1960-72

S.I.C. NO.	INDUSTRY	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972
1010	SLAUGHTERING & MEAT PROCESSORS	.12	.10	.11	.11	.12	.11	.11	.11	.10	.10	.10	.11	.10
1030	POULTRY PROC.	NA	.09	.09	.08	.08	.09	.09	.09	.11	.11	.10	.10	.11
1110	FISH PRODUCTS	.16	.22	.22	.19	.21	.19	.18	.15	.15	.18	.19	.21	.22
1120	FRUIT & VEG. CANNERS & PRESERVERS	.28	.28	.28	.28	.30	.30	.30	.30	.29	.29	.27	.27	.28
1230	FEED MANUF.	.16	.15	.16	.15	.16	.16	.16	.16	.16	.17	.16	.16	.16
1240	FLOUR MILLS	.15	.16	.14	.13	.14	.15	.16	.14	.13	.15	NA	NA	NA
1250	BREAKFAST CEREAL MANUFACTURERS	.50	.47	.45	.48	.47	.48	.50	.48	.49	.48	NA	NA	NA
1280	BISCUIT MANUF.	.32	.34	.34	.34	.36	.37	.37	.36	.36	.35	.33	.31	.33
1290	BAKERIES	.25	.37	.37	.35	.35	.36	.36	.36	.37	.35	.33	.33	.33
1310	CONFECTIONARY MANUF.	.33	.33	.32	.32	.32	.34	.35	.34	.35	.35	.34	.34	.35
1330	SUGAR REFINERIES	.26	.23	.28	.21	.16	.27	.27	.30	.29	.29	.26	.23	.20
1350	VEG. OIL MILLS	.13	.12	.10	.11	.10	.09	.10	.09	.10	.11	.13	.12	.11
1391	MACARONI MANUF.	.37	.35	.31	.32	.31	.34	.31	.29	NA	NA	NA	NA	NA
1392	MIS. FOOD MAN.	.32	.31	.32	.32	.32	.33	.34	.35	.35	.35	.32	.31	.35
1410	SOFT DRINK MAN.	.58	.58	.57	.54	.54	.54	.53	.52	.49	.47	.44	.43	.42
1430	DISTILLERIES	.60	.60	.60	.62	.63	.62	.64	.64	.66	.65	.64	.64	.66
1450	BREWERIES	.64	.62	.62	.63	.63	.62	.62	.62	.63	.62	.62	.61	.63
1470	WINERIES	.45	.46	.49	.46	.44	.46	.45	.41	.48	.45	.45	.44	.43

NA - Not Available.

1. Price-cost margin = $\frac{\text{value added-wages}}{\text{value of shipments}}$. Value added includes value of shipments + net change in inventory - cost of materials , fuel and electricity.

SOURCE: Statistics Canada, Manufacturing Industries of Canada, Catalogue No. 31-203, 1961-73.

APPENDIX D

CHI-SQUARE TEST. AVERAGE PRICE STABILITY INDICES IN THE "HIGH", "MEDIUM" AND "LOW" RANGES OF CONCENTRATION.

RANGE OF CONCENTRATION	OBSERVED FREQUENCY (fo)	EXPECTED FREQUENCY (fc)	$\frac{(fo - fc)^2}{fc}$
"LOW"	5.03	3.55	1.48
"MEDIUM"	3.43	3.55	-.12
"HIGH"	2.20	3.55	-1.35
			X^2= 1,2680*

* signifies significance at the 90% level of confidence

APPENDIX E

CHI-SQUARE TEST. AVERAGE PRICE-COST MARGINS IN THE "HIGH", "MEDIUM" AND "LOW" RANGES OF CONCENTRATION

RANGE OF CONCENTRATION	OBSERVED FREQUENCY (fo)	EXPECTED FREQUENCY (fc)	$\frac{(fo - fc)^2}{fc}$
"LOW"	.13	.29	.1969
"MEDIUM"	.30	.29	.0003
"HIGH"	.44	.29	.0511
			$X^2 = 13.6^*$

* signifies significance at the 90% level of confidence